REMARKS/ARGUMENTS

A PETITION FOR EXTENSION OF TIME has been filed, concurrently with this Amendment, extending the time for response to the Official Action one (1) month, from September 3, 2004, to October 3, 2004.

As a result of this Amendment, claims 12-14 and 21-26 are under active consideration in the subject patent application.

In the Official Action, the Examiner has:

(1) stated that the Declaration under 37 C.F.R. §1.131 on 2/05/2004, is considered ineffective in overcoming the reference U.S. Patent No. 6,571,117, issued to Marbach;

(2) rejected claims 12 and 14 under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 6,571,117, issued to Marbach;

(3) rejected claims 21 and 22 under U.S.C. § 103(a) in view of U.S. Patent No. 6,571,117;

(4) objected to claim 13 as being dependent upon a rejected base claim, but indicating that claim 13 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims;

(5) rejected claim 17 under 35 U.S.C. §112, second paragraph , issued to Marbach;

(6) rejected claim 17 under U.S.C. §102(e) in view of U.S. Patent No. 6,392,752, issued to Johnson; and

(7) rejected claim 17 under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,483,641, issued to MacAulay.

With regard to Items 1-3, the Examiner has rejected claims 12 and 14 under 35 U.S. C. §102(e) as being anticipated by U.S. Patent No. 6,571,117, issued to Marbach, and claims, 21 and 22 as being obvious in view of Marbach. The Examiner has stated that the Declaration under 37 C.F.R. §1.131 that was submitted on February 5, 2004 is considered ineffective in overcoming U.S. Patent No. 6,571,117, issued to Marbach. Applicants respectfully disagree with the Examiner's characterization of that Declaration and of the Marbach patent, and request reconsideration for the following reasons.

More particularly, the Marbach patent issued on May 27, 2003, from Application Serial No. 09/925,380, filed August 10, 2001, and claiming the benefit of Provisional Patent Application Serial No. 60/224,533, filed August 11, 2000. Thus the Marbach reference issued less than one year from the filing date of the instant application. The claims of the Marbach reference are directed to a wholly distinct and separate invention when compared to Applicant's claimed invention (i.e., a noninvasive blood analysis methods versus a chemical imaging system comprising a near infrared imaging detection system and a visible imagery system).

Applicants respectfully submit that the Marbach reference is not valid prior art with respect to the instant Application, since the present invention was conceived prior to August 11, 2000, and Applicants worked diligently to a

reduction to practice at least as early as October 13, 2000, when Provisional Patent Application Serial No. 60/239,969 was filed, and from which parent Patent Application Serial No. 09/976,391, filed October 12, 2001, claims the benefit.

In support of Applicants' position that the Marbach reference is not valid prior art under 35 U.S. C. §102(e), an Affidavit under 37 C.F.R. 1.131, had been submitted to the Examiner in response to the Official Action mailed February 5, 2004. In order to comply with the Examiner's objections to that submission, a second Affidavit under 37 C.F.R. 1.131, is attached to this Amendment. This second Rule 1.131 Affidavit of Patrick J. Treado, Matthew Nelson, and Scott Keltzer and its supporting Exhibits A-Q provide ample factual documentary evidence of Applicants' conception of their invention prior to August 11, 2000, and of their diligence in moving from conception to a reduction to practice. Accordingly, the Marbach reference is not valid prior art with respect to Applicant's invention. Claims 12, 14, 21, and 22 are allowable over the Marbach reference.

With regard to Item 4, Applicants acknowledge with appreciation the Examiner's determination that the limitations of the independent claim 12 combined with the limitations of claim 13 presents subject matter that is allowable over all of the prior art of record in the case.

With regard to Items 5-7, Applicants have combined the allowable subject matter presented by the combination of claims 12 and 13 with the subject matter of now cancelled claim 17. This combination has been presented as new claims

23-24. The subject matter of claims 21 and 22 has been combined with the allowable subject matter of claims 12 and 13 in new claims 25 and 26. New claims 23-26 are allowable. The Commissioner is authorized to charge the fees in connection additional independent claims namely, $132.00, and the fees for a Petition for Extension of one (1) month , namely, $55.00, and any additional fees in connection with this matter, to Deposit Account No. 04-1679.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

If a telephone conference would be of assistance in advancing prosecution of the above-identified application, Applicants' undersigned Attorney invites the Examiner to telephone him at **717-237-5516**.

Respectfully Submitted,

Date: 10/1/04

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HBG\129420.1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/773,077
Applicant	:	Patrick TREADO et al.
Filed	:	05 February 2004
Title	:	NEAR INFRARED CHEMICAL IMAGING MICROSCOPE
TC/A.U.	:	2877
Examiner	:	Lauchman, Layla G
Docket No.	:	E2079-00028 (030687)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Sir:

AFFIDAVIT OF PATRICK J. TREADO, MATTHEW NELSON, AND SCOTT KELTZER UNDER 37 C.F.R. 1.131

We, Patrick J. Treado, Matthew Nelson, and Scott Keltzer, the sole inventors named in the above-identified patent application ("the '077 application") state as follows:

1. All of the events outlined below occurred in the United States of America.

2. Prior to August 11, 2000, we invented a chemical imaging system comprising a near infrared imaging detection system and a visible imagery system.

3. We were, at the time of the conception of our invention employed by ChemImage Corporation, of Pittsburgh, Pennsylvania.

4. Prior to August 11, 2000, and as a part of our on-going, diligent efforts to reduce our invention to practice, we conducted a series of laboratory based tests of our conception of a chemical imaging system comprising of a near infrared imaging detection system and a visible imagery system.

5. During the Spring of 1999, Juliana Ribar was an employee of ChemImage Corporation having duties of conducting testing on products and technologies developed by researchers, including ourselves, at ChemImage Corporation.

6. During this time Juliana Ribar reported to ChemImage Senior Scientist, inventor, and one of the undersigned Affiants, Matthew Nelson.

7. During the Spring of 1999, Juliana conducted testing at our request, and under our control and direction, of our chemical imaging system comprising a near infrared imaging detection system and a visible imagery system.

8. As a part of her regular duties, Juliana maintained a laboratory notebook and journal to document her activities and the results of the testing she had been instructed to perform.

9. Matthew Nelson reviewed Juliana Ribar 's work product and signed most of her laboratory notebook entries as a witness.

10. Around April of 1999, investigations were undertaken in the ChemImage laboratory regarding optimal imaging conditions necessary to visualize defects and examine the photoluminescence in the near infrared for a sample CZT.

11. Using a liquid crystal tunable filter imaging device, tuned to different operating conditions, both near infrared (NIR) and visable images were achieved.

12. Between April of 1999 and May of 1999 a variety of experimental configurations as well as imagery and data acquisition modes were used to determine optimal conditions for combined visual imagery and NIR chemical imaging of samples.

13. On or about April 15, 1999, chemical imaging based on a near infrared imaging detection system and a visible imagery system was performed where the operating conditions of the liquid crystal tunable filter were changed to a range of 700 nanometers (nm) to 950nm with a manual setting/control set to 700nm. This combination of a near infrared imaging detection system and a visible imagery system was documented at page 55 of Juliana Ribar's laboratory notebook. (Attached as Exhibit A).

14. The operating condition of 700nm corresponds to wave lengths of light that are visible, therefore the images that were observed in the ChemImage laboratory's on or about April 15, 1999, and are memorialized in Juliana Ribar's laboratory notebook correspond to visual imagery obtained at the same time that a near infrared imaging detection system was employed to produce a chemical image.

15. Such visual images are referred to as "bright field images by microscopists, and these images are recorded in Juliana Ribar's laboratory notebook as "bright field.tif".

16. Near infrared images of samples identified in Juliana Ribar's laboratory notebook are identified as "NIR.tif".

17. An entry at approximately the middle of page 55 of Juliana Ribar's laboratory notebook (Exhibit A) states: "...on the video screen the polarized image can be seen ..." further attesting to the fact that at least as early as April 15, 1999, visual images and NIR chemical imaging had been combined as claimed in our above-identified U.S. patent application.

18. Additional laboratory work comprising a combination of a near infrared imaging detection system and a visible imagery system occurred in and around April 20-April 22, 1999. The results of that laboratory work are schematically shown in pages 56-61 of Juliana Ribar's laboratory notebook, Attached as Exhibit B.

19. The information presented in Exhibit B schematically indicates and logs data for various near infrared images and bright field images of samples with the same file labeling nomenclature.

20. On or about April 23, 1999, documents were generated showing actual bright field images (attached as Exhibit C) in corresponding near infrared chemical images (attached at Exhibit D) both showing particular defects that were imaged using a near infrared imaging detection system and a visible imagery system.

21. On or around May 10, 1999 to May 12, 1999, a variety of additional experimental arrangements of near infrared imaging detection systems and visible

imagery systems were explored at the ChemImage Laboratory, as indicated in page 65 of Juliana Ribar's laboratory notebook, attached as Exhibit E.

22. At the top left portion of Exhibit E, there is a schematic diagram of an apparatus arranged in accordance with the structure defined by claim 1 of U.S. Patent Application Serial No. 10/773,077, and at the upper right there is a notation that visible light having a wavelength of 532nm was employed, with NIR light having a wavelength from 860nm to 870nm which is documented at the center bottom of the page.

23. On or about May 13, 1999, an arrangement of near infrared imaging detection systems and visible imagery systems were assembled with a liquid crystal tunable filter having a range from 680nm to 950nm, again covering visible wavelengths of light to near infrared wavelengths of light. Illumination of the sample during this time was performed using a laser that emitted coherent light at 532nm. This experimental configuration is evidence in Juliana Ribar's laboratory notebook at page 67, attached as Exhibit F.

24. On or about May 24, 1999, a further experimental configuration of an infrared imaging detection system and a visible imagery system was explored in which a laser imitating light at 532nm (visible light) using a Xe/Tungstun lamp was employed.

25. Images from a chemical imaging system comprising a near infrared imaging detection system and a visible imagery system were produced as shown in Exhibits G and H from Juliana Ribar's laboratory notebook, which show bright field

visible images and near infrared images, as captured on pages 77-90 of Juliana Ribar's laboratory notebook as evidenced by Exhibit I.

26. Between May of 1999 and October of 2000, a multiplicity of additional experimental configurations for a chemical imaging system comprising a near infrared imaging detection system and a visible imagery system were explored and optimized so as to confirm that our invention continued to operate as conceived and intended, all of which had been documented on: July 6, 1999, as evidenced in Exhibit J; September 7-20, 1999, as evidenced in Exhibit K, on October 12, 1999, as evidenced in Exhibit L, on December 13, 1999, as evidenced in Exhibit M, March 1, 2000, as evidenced in Exhibit N, on March 2, 2000, as evidenced in Exhibit O, on June 1, 2000, as evidenced in Exhibit P, and August 14, 2000, as evidenced in Exhibit Q, all of which work and experimentation convinced us that our invention worked as we intended.

27. As supported by Exhibits A-Q, between May of 1999 and October of 2000, we worked diligently to a reduction to practice of our chemical imaging system comprising a near infrared imaging detection system and a visible imagery system as evidenced by our filing of Provisional Patent Application Serial No. 60/239,969 on October 13, 2000, and from which parent Patent Application Serial No. 09/976,391, filed October 12, 2001, claims the benefit.

28. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false

statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, Section 1001, and that such willful false statements may jeopardize the validity of the above-identified application or any patent issuing thereon.

Date: 9/29/04

Patrick J. Treado

Date: 9-26-04

Matthew Nelson

Date: 9/28/04

Scott Keltzer

HBG\129470.2

Notebook No. LNTT-006

PROJECT CHISM

Cor ed From Page

TRANSMISSIONS: (REFLECTANCE) (TRANSMITTANCE) (FLUORESCENCE) (USER-TRANSMITTANCE MODE)
BRIGHT FIELD, NIR, POLARIZED, PHOTOLUMINESCENCE.

EXPOSURE TMG: ~~5sec~~ 3sec ~~25sec~~ 10 sec.

ROI: 100-511

OBJECTIVE MAGNIFICATION: 20X LASER: 0.17W

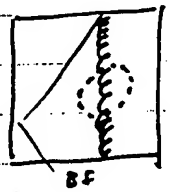
SWGEP: 700-1800 ★ AT 002, CHANGED TO 700-950.

STEP: 5 BINNING: 2X 2Y

LCTF MANUAL CONTROL: 700nm

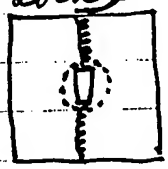
ETCHED

DEFECT 1-001 3-013 5-006
2-004 4-007

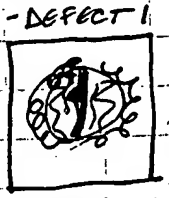


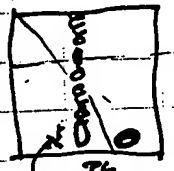
D: ATP, nir, bf, pl, 1
• 990419_JMR_C2T_Brightfield.tif
• NO POLARIZED IMAGE COULD BE SEEN.
• 990419_JMR_C2T_NIR.tif

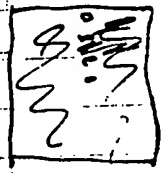
003
★ ~~002~~ - LASER SWITCHED TO 0.14/0.15W - "HELIX" Q,2,2 - DEFECT 1



• 990419_JMR_C2T_003_Photoluminescence.tif
• 990419_JMR_C2T_003-Snappy.tif
• 990419_JMR_C2T_003_Brightfield.tif
• 990419_JMR_C2T_003_Polarized.tif

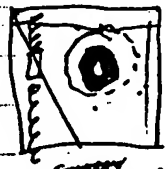




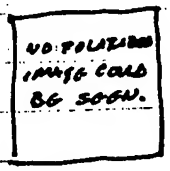


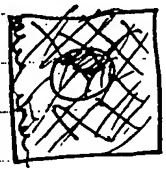
- on the videoscreen the polarized image can be seen. It appears as a string of dots in a long, skinny lighter gray rectangle.

004 Q,2,2
"DEFECT A" (ROUND SHAPED DEFECT)



• 990419_JMR_C2T_004_Snappy.tif
• 990419_JMR_C2T_004_Brightfield.tif
• 990419_JMR_C2T_004_NIR.tif
(THE POLARIZED IMAGE COULD NOT BE SEEN)
• 990419_JMR_C2T_004_Photoluminescence.tif
★ NOTED - THE DATA SET WAS TAKEN TWICE AND THE SAMPLE DEVELOPED A "BURNT SPOT" BY THE END OF
005 THE SECOND ACQUISITION.





Continued on Page

55

Read and Understood By

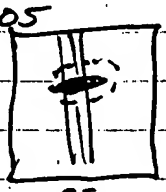
Juliana M. Rios
Signed

4/19/99
Date

Signed

4/19/99
Date

005 "DEFECT B" Q.2.2

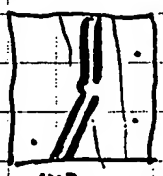


- 990415_JMR_CZT_005_Photoluminescence.tif
- 990415_JMR_CZT_005_NIR.tif
- 990415_JMR_CZT_005_Snappy.tif
- 990415_JMR_CZT_005_Bright field.tif
- ~~No photocurrent~~ NO POLARIZED IMAGE COULD BE SEEN.

006 Q.2.2 BF2 B+39 C+80

- 990420_JMR_CZT_006_BRIGHT FIELD.tif
- 990420_JMR_CZT_006_Polarized.tif
- 990420_JMR_CZT_006_NIR.tif
- 990420_JMR_CZT_006_Snappy.tif
- 990420_JMR_CZT_006_Photoluminescence.tif

(LINE COULD ONLY BE SEEN ON THE MONITOR, NOT THE PHOTOGRAPH)



POLARIZED2 B+81 C+37 (although THE LINE COULD BE SEEN ON THE MONITOR, LINE COULD NOT BE SEEN ON THE IMAGE.)

* SWEEP FOR NIR CHANGED TO 830-950. Photoluminescence REMAINS AT 700-950.

007 Q.3,0 - HEAVY, THICK "TWIG" LIKE STRUCTURES AND A DEFECT "PARAMECIUM" LIKE

- 990420_JMR_CZT_007_Bright field.tif
- 990420_JMR_CZT_007_Polarized.tif 2-B+77 C+85
- 990420_JMR_CZT_007_NIR.tif
- 990420_JMR_CZT_007_Snappy.tif
- 990920_JMR_CZT_007_Photoluminescence.tif

VERY CLEAR IMAGE.

CONFIGURATION UPDATE.

NIR EXPOSURE TIME: 3 sec ; ROI 100-511 ; OBJECTIVE MAGNIFICATION: 20X
SWEEP: 830-950 ; STEP: 5 ; BINNING: 2X 2Y ; LCTF MANUAL CONTROL: 830.

PL EXPOSURE TIME: 10 sec ; ROI 100-511; OBJECTIVE MAGNIFICATION: 20X
SWEEP: 700-~~950~~; STEP 5; BINNING: 2X 2Y; LCTF MC: 700

Continued on Page

Read and Understood By

Juliana M. Ribar 4/20/99
Signed Date

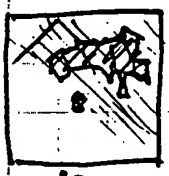
Signed Date

PROJECT CHISM

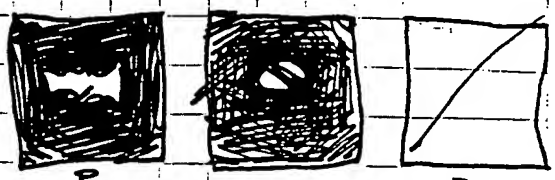
NOTEBOOK NO. [illegible]

Continued From Page

008 LARGE DEFECT. - BLUE-ISH IN COLOR. ☆☆☆

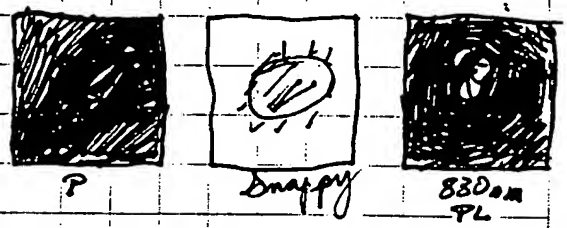


- 990420_JMR_C2T_008_Brightfield.tif
- 990420_JMR_C2T_008_Polarized.tif
- 990420_JMR_C2T_008_NIR.tif
- 990420_JMR_C2T_008_Snappy.tif
- 990420_JMR_C2T_008_Photoluminescence.tif



009 TWO LINES IN THE MIDDLE OF A LARGE "HELIX" PATTERN. DEFECT 1

- 990420-JMR_C2T_0009_Brightfield.tif
- 990420_JMR_C2T_009_Polarized.tif RW
- 990420-JMR_C2T_009_NIR.tif 100s 905nm
- 990420-JMR_C2T_009-Snappy.tif RW
- 990420-JMR_C2T_0009-Photoluminescence.tif 100s 825



POLARIZED BRIGHTNESS CHANGED TO 466, CONTRAST TO 880

010 LARGE DEFECT - OBJECT APPEARS TO HAVE DEPTH. DIFFERENT LAYERS CAN BE FOCUSED. Q.2,2

"COTTON BALLS"

☆OBJECT SHINES BRIGHTLY WHEN POLARIZED

- 990420_JMR_C2T_010_Brightfield.tif
- 990420_JMR_C2T_010_Polarized.tif
- 990420_JMR_C2T_010_NIR.tif
- 990420_JMR_C2T_010_Snappy.tif
- 990420_JMR_C2T_010_Photoluminescence.tif

☆ DAMAGE BY THE LASER NOTED. THE DAMAGE TO THE DEFECT LOOKS SIMILAR TO THE DARK SPOT IN THE NIR IMAGE. LASER WATTAGE WILL BE LOWERED TO 0.10W

Q.2,3 - HUGE COTTON BALL LIKE DEFECT NOTED.

Continued on Page

57

Read and Understood By

Juliana M. Ribar
Signed

4/20/99
Date

Signed

Date

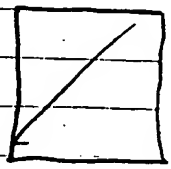
011 HUGE DEFECT - "COTTON BALL" TYPE. Q. 2,3 DEFECT 2

BF

- 990420_JMR_C2T_011_Brightfield.tif
- 990420_JMR_C2T_011_Polarized.tif
- 990420_JMR_C2T_011_NIR.tif
- 990420_JMR_C2T_011_Photoluminescence.tif
- 990420_JMR_C2T_011_Snappy.tif

P

NIR 855nm



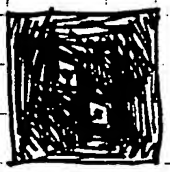
- BRIGHTFIELD ADJUSTED - BRIGHTNESS +29, CONTRAST +15. POLARIZED - B - +70 C - +15

*NOTED - THE LASER ON THIS SPOT BURNED MADE A SLIGHT BURN AT JUST 0.10W. THIS COULD BE DUE TO A VARIATION IN THE COMPOSITION OF THE STRUCTURE. THE LASER WILL BE PLACED AT 0.10W FOR THESE DEFECTS AND 0.14W FOR ALL OTHER DEFECTS ^

012 CRYSTALINE DEFECTS. Q. 3, 1 0.14W

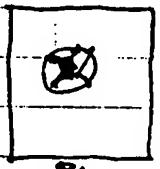
BF

- 990420_JMR_C2T_012_BRIGHTFIELD.tif
- 990420_JMR_C2T_012_Polarized.tif
- 990420_JMR_NIR.tif
- 990420_JMR_Photoluminescence.tif



P

NIR 840



PL

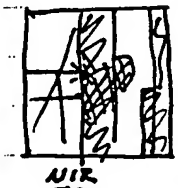
*LASER BURN WAS NOTED. WATTAGE BEING DROPPED TO 0.10W.

013 : DEFECT IMBEDDED IN DEEP SCRATCHES. *(INTERRESTING) Q. 4,1 DEFECT 3

BF.

- 990420_JMR_C2T_013_Brightfield.tif
- 990420_JMR_C2T_013_Polarized.tif
- 990420_JMR_C2T_013_NIR.tif 855nm
- 990420_JMR_C2T_013_Photoluminescence.tif
- 990420_JMR_C2T_013_Snappy.tif

P



NIR 890nm

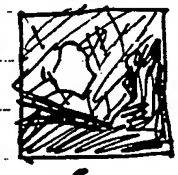
* PL DIFFERENT FROM THE USUAL

BRIGHTFIELD 2 B +16, C +11 ; POLARIZED 2 B +39, C +42

014 - DEFECT IMBEDDED IN DEEP SCRATCHES *** (INTERRESTING - HUGE STRUCTURE) Q. 4,1

- 990420_JMR_C2T_014_Brightfield.tif
- 990420_JMR_C2T_014_Polarized.tif
- 990420_JMR_C2T_014_NIR.tif
- 990420_JMR_C2T_014_Photoluminescence.tif
- 990420_JMR_C2T_014_Photoluminescence.tif

NIR 950nm



P

PL 785

Continued on Page

58

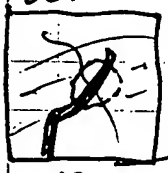
Read and Understood By

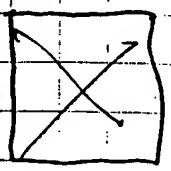
Juliana M. Tilson 4/20/99 Signed Date

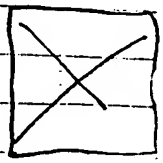
Signed Date

UNETCHED SAMPLE

001







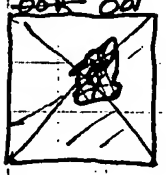
- 990422_JMR_C2T_001_Brightfield.tif
- 990422_JMR_C2T_001_Polarized.tif

★COMPUTER CRASHED. THIS DATASET COULD NOT BE FINISHED. THIS DATA WAS ERASED AND A NEW SPOT WAS CHOSEN.

Report

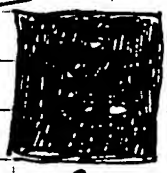
Defect #	
1	007
2	002
3	003
4	004
5	005

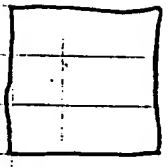
~~002~~ 001



HELIX PATTERN IN AN "L" FORMATION.

- 990422_JMR_C2T_001_Brightfield.tif
- 990422_JMR_C2T_001_Polarized.tif
- 990422_JMR_C2T_001_NIR.tif • NIR_alloo.tif
- 990422_JMR_C2T_001_Photoluminescence.tif • PL_alloo.tif
- 990422_JMR_C2T_001_Snappy.tif



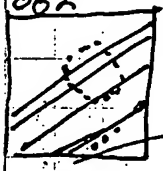


.417 um/pixel

DEFECT 1, BIREFRINGENT. LATICE SHAPED DEFECT.

Q.2.3

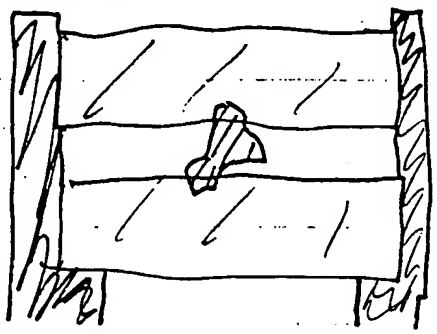
002 SCRATCHES



- 990422_JMR_C2T_002_Brightfield.tif
- 990422_JMR_C2T_002_Polarized.tif

THIS DATA SET WAS ERASED.

IT WAS NOTICED THAT THE IMAGE WASN'E PERFECTLY COLDER ILLUMINIZED. CHRIS ADJUSTED THE MICROSCOPE AND DUSTED AWAY MORE DUST PARTICLES. MEANWHILE, THE SMALL, FRAGILE PORTION OF THE C2T SAMPLE SLIPPED OFF THE STAGE AND SHATTERED. A LARGER PIECE WAS SELECTED TO CONTINUE THE EXPERIMENT. THIS NEW PIECE WAS PLACED ON TWO PYREX SLIDES . . .



THE DATA WAS TAKEN ON A PORTION OF THE C2T SAMPLE NOT UNDERNEITH THE GLASS SLIDES.

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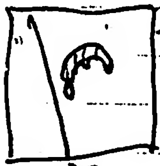
Juliana M Rider. — Signed — 4/22/99 — Date

Signed — 4/22/99 — Date

002 CAR



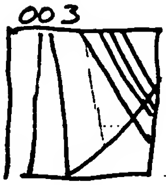
BF

- 990422_JMR-CZT-002_Brightfield.tif
- 990422_JMR_CZT_002_Polarized.tif 2-B +71, C+S
- 990422_JMRCZT-002_NIR.tif
- 990422_JMR_CZT-002_Snappy.tif
- 990922_JMR_CZT002_Photoluminescence.tif

A LARGE DEFECT.
TYPE 2-AMORPHOUS DEFECT. Q.3,4

P NIR

003 SHALLOW SCRATCHES

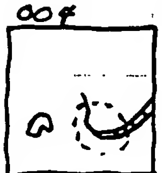


BF

- 990422_JMR-CZT-003_Brightfield.tif
- 990422_JMR_CZT_003_Polarized.tif
- 990422_JMR-CZT_003-NIR.tif Q. 2,1
- 990422_JMR-CZT_003_Photoluminescence.tif
- 990422_JMR-CZT_003-Snappy.tif

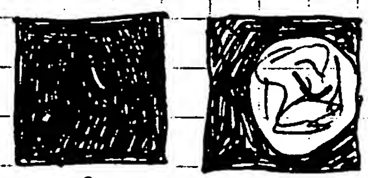
P 890nm NIR PL 825nm

004 2SCRATCHES CONVERGING



BF

- 990422_JMR-CZT_004_Brightfield.tif
- 990422_JMR-CZT_004_Polarized.tif
- 990422_JMR-CZT_004_NIR.tif Q.3,2
- 990422_JMR CZT_004_Snappy.tif
- 990922_JMR_CZT_004_Photoluminescence.tif

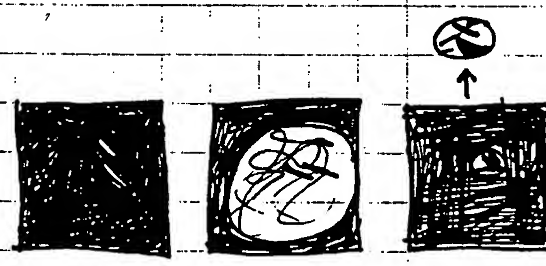


P NIR 920nm

005 TWO DEEP SCRATCHES

BF

- 990422_JMR_CZT_005_Brightfield.tif
- 990422_JMR_CZT_005_Polarized.tif
- 990422_JMR_CZT_005_NIR.tif Q.4,3
- 990422_JMR_CZT_005_Photoluminescent.tif
- 990422_JMR_CZT_005_Snappy.tif



P NIR 895nm PL 780nm

60

Continued on Page

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Signed: [signature] Date: 4/22/99

PROJECT CHISM

Notebook No. LN77-W6

Continued From Page

MICROSCOPE SET UP INFO.

MODE	DIRECTION OF LIGHT		LAMP ON/OFF	LASER ON/OFF	SOFTWARE USED	MIRROR SETTINGS
AIR		NO FILTERS	ON	OFF	A.Q.M.	O ■
BF		NO FILTERS	ON	OFF	SNAPPY	■ BF
Polarized		FILTERS	ON	OFF	SNAPPY	■ BF
PHOTOLUMINESCENCE		NO FILTERS	OFF	ON	AQM	O ■
LASER DOT "SNAPPY"		NO FILTERS	OFF	ON	SNAPPY	O ■

61

Continued on Page

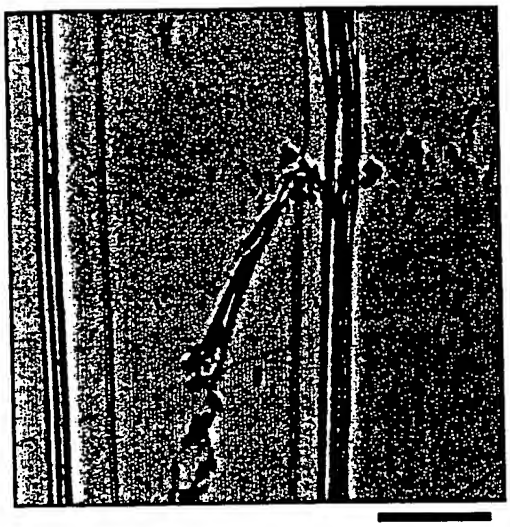
Read and Understood By

Juliana M. Ribar — Signed — 4/22/99 — Date

[illegible signature] — Signed — 4/[illegible]/99 — Date

Project Title: Chemical Imaging for Semiconductor Metrology
Project No.: 98ATP01
Date: May 24, 1999

Brightfield and Polarized Images of Etched CZT Defect 1



133.4 µm

Parameters

Sample Identification: Etched

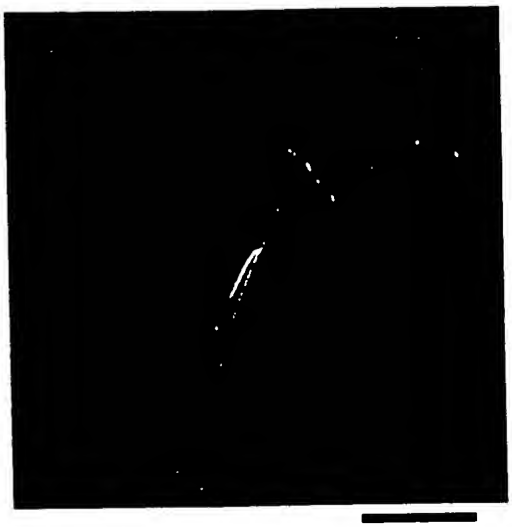
Position: Quadrant 3,3

Type: Brightfield

Objective: 20X

Comments: The defect has a lattice like structure.

Source: Tungsten Lamp



133.4 µm

Parameters

Sample Identification: Etched

Position: Quadrant 3,3

Type: Polarized

Objective: 20X

Observations:The defectis more bifringent at some points than at others.

Source: Tungsten Lamp

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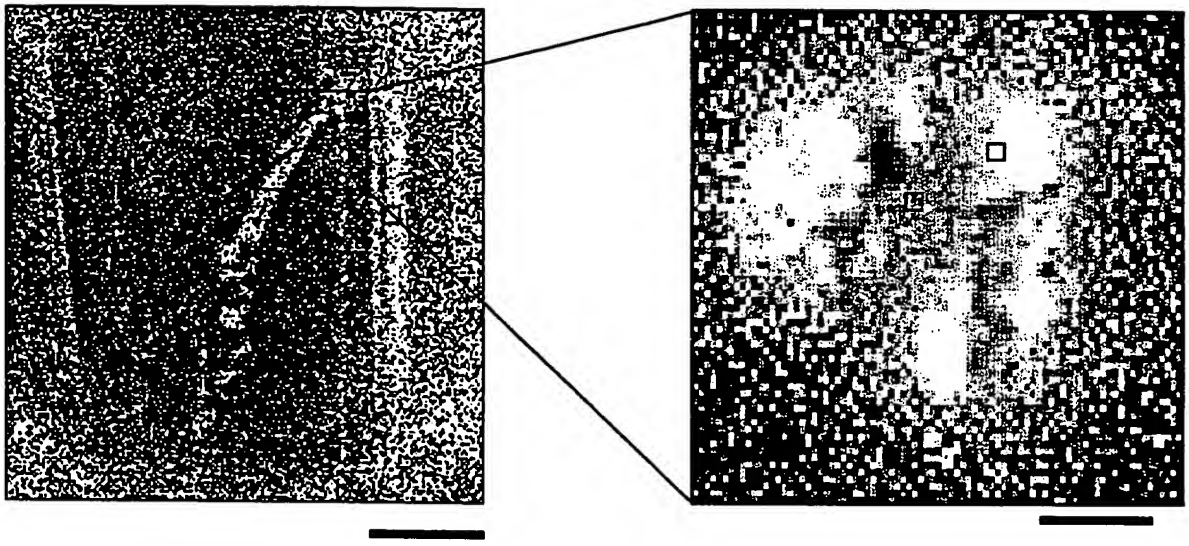
Juliana M. Piltan
Signed

4/23/99
Date

Signed

4/23/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Etched CZT Defect 1



133.4 µm

16.76 µm

Parameters

Sample Identification: Etched

Position: Quadrant 3,3

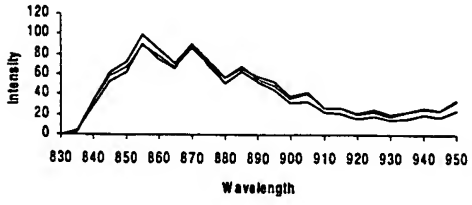
Type: NIR

Wavelength: 905 nm

Objective: 20X

Observations: The defect has a similar spectrum to the large lines to its right and a different spectrum from the surrounding area.

Source: Tungsten Lamp



Parameters

Sample Identification: Etched

Position: Quadrant 3,3

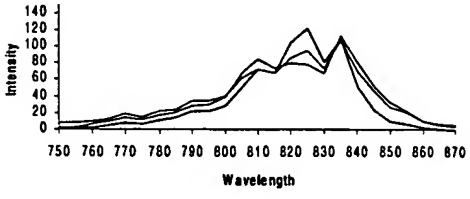
Type:Photoluminescent

Wavelength: 825 nm

Objective: 20X

Observations: Spectral variations were noticed between points taken in the dark, gray and light regions.

Source: Tungsten Lamp



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Juliana M. Rubio
Signed

4/23/99
Date

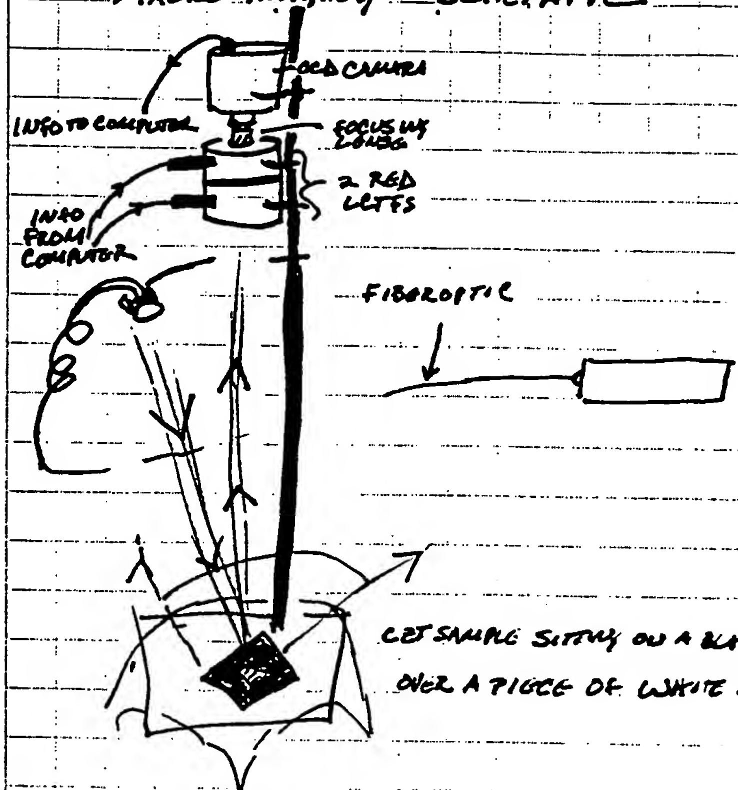
Signed

Date

PROJECT Chism - Macro, Jim

Note

MACRO IMAGING SCHEMATIC GREEN 5-10-99

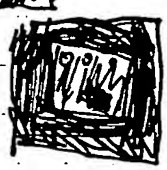


LASER- SET AT 2W POWER 532nm

CZT SAMPLE SITTING ON A BLACK DISK (THE STAGE) OVER A PIECE OF WHITE LENSE PAPER

PRELIMINARY OBSERVATIONS

- 25 s. ACQUISITION TIME WAS NEEDED TO ~~get~~ FLOURESCE
- AT ~~885~~ 885 nm THE DEFECTS IN THE SAMPLE BECOME APPARENT.
-  860 nm ~~25~~ 25 s. (SOME DEFECTS BECAME VISIBLE
865 · NOT AS STRONG

 870 nm + 865 - LASER SPOT VERY EVIDENT.

ETCHED CZT BROKE 5-12-99

65

Continued on Page

Read and Understood By

Signed: Jaliana M. Rita Date: 5/12/99

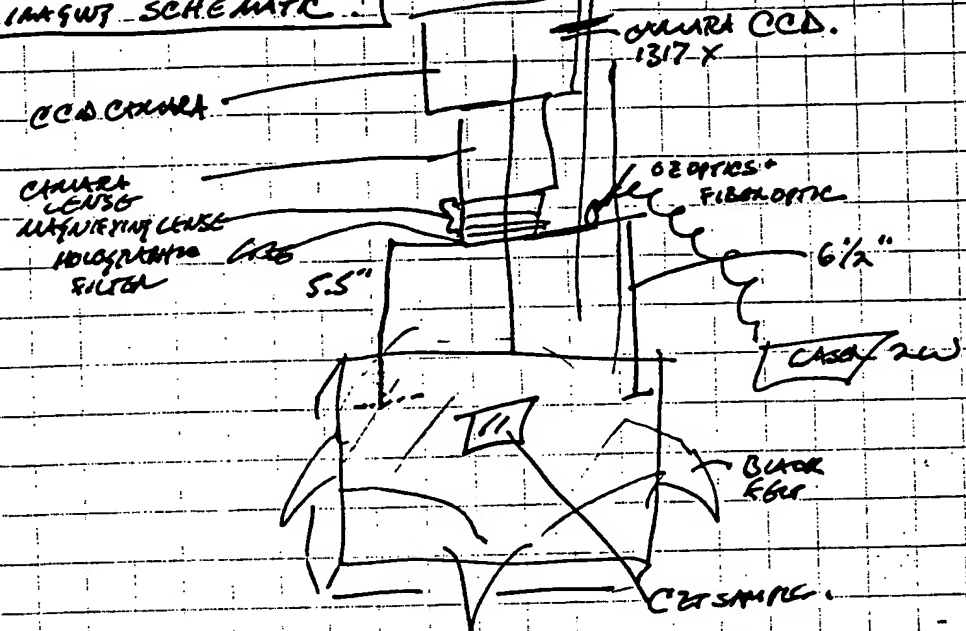
Signed: [illegible] Date: [illegible]

PROJECT ~~ATP~~ CHISM - Macro System

No

MACRO IMAGING SCHEMATIC

5-12-99



FIBEROPTIC WAS VIBRATED SLIGHTLY TO SPREAD THE LASER LIGHT, REDUCING GRAININESS.

CAMERA LENSE - FUJINON TV ZOOM LENSE H6X12.5R (MAGNIFYING LENSES SCREW ON TO THE CAMERA LENSE)

MAGNIFICATION LENSES - ~~10~~ 11X (4X, + 4X + 1X + 2X)

LASER: 532nm GREEN LASER.

CAMERA CCD: 1317-K1 PRINCETON INSTRUMENTS INC.

PLATFORM: 2.25" FROM GROUND

~~AT~~ OZ OPTICS: 6.5" FROM GROUND

~~LENSE~~ HOLOGRAPHIC FILTER: 5.5" FROM GROUND

FILTER: 660nm HOLOGRAPHIC FILTER.

INTEGRATION TIME: 25 SEC.

/LAB1//ATP PHOTOLUMINESCENCE/

990512_001_ETCHED CZT MACRO — PHOTOLUMINESCENT IMAGE OF ETCHED CZT. W/ FILTER IN A DARK ROOM - LASER 2W USING WIN ~~SPEC~~ VIEW (AQM NOT COMPATIBLE W/ THIS CCD.)

990512-002_ETCHED CZT MACRO — SAME ~~IMAGE~~ CONFIGURATION SETUP BUT W/ NO LASER + W/ THE LIGHTS ON.

990512_003_ETCHED CZT MACRO — SEMI WHITE LIGHT - ROOM LIGHT + 660nm ~~HP~~ PASS FILTER

Continued on Page 66

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Juliana M. Ribar 5/12/99
Signed Date

[signature] 5/12/99
Signed Date

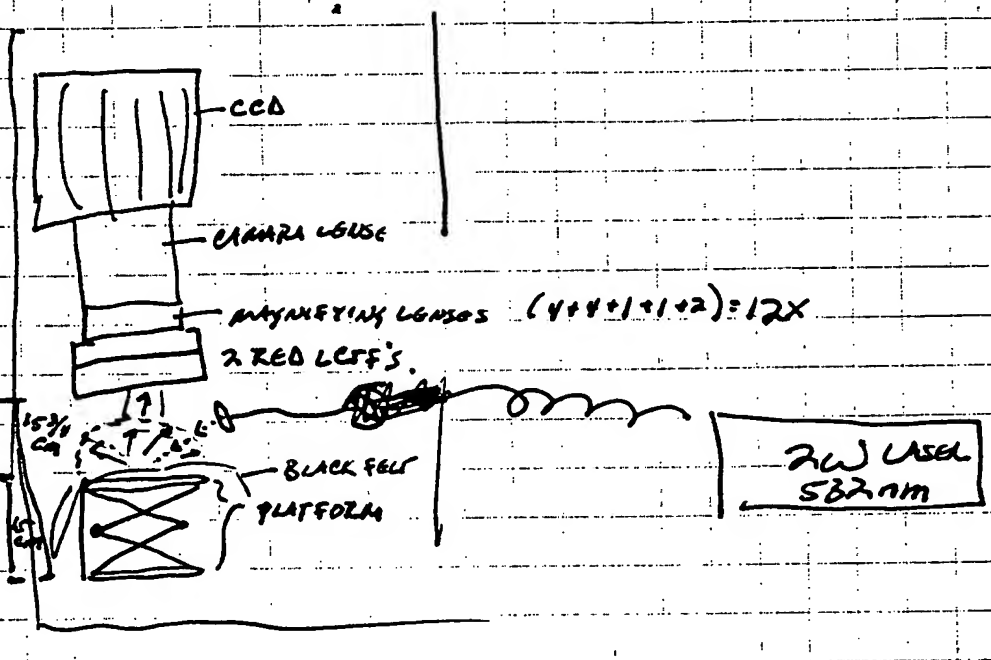
PROJECT Chirm - Macro system

990512_ETCHED CZT MACRO_004_ LASER ON - DARK ROOM.

990512-ETCHEDCZTMACRO-005_ RESOLUTION TARGET.

MAY 13, 1999.

MACRO SYSTEM CONFIGURATION.



ETCHED CZT USED.

990513_1 006- MACRO RESTART * RESOLUTION TARGET FOR THIS SYSTEM CONFIGURATION

SERIES = 2, ITEM 1

5-14-99

CCD DETECTOR - KODAK 1035 X1317 SHUTTER TYPE: LARGE. LASER: 532nm 2W

SETPOINT -40 (READ-1025) MAGNIFICATION: ~~7X~~ (4X+2X+1X)

INTEGRATION TIME: 25sec. NO ROI

LCTF TUNING: ~~680~~ 680-700nm RED LCTF MANUAL SET: ~~680nm~~ STEP SIZE: 10

ROI - CLEAR. (IF NOT CLEAR, THE BINNING WON'T WORK.)

CAMARA: SET AT 512X512 16K FRONT ILLM ADC TYPE - FAST READ OUT MODE: FULL FRAME

* SCOTT ADDED A NEW VERSION OF ACQUISITION MANAGER.
THE NEW VERSION (4.8r) WAS USED TO COLLECT THIS DATA.

Continued on Page

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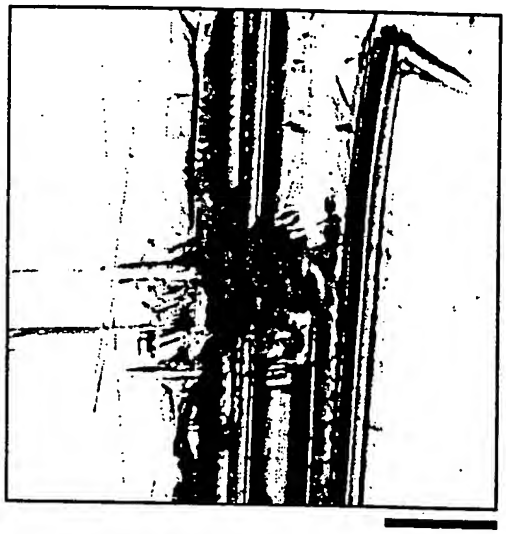
Signed Date

Signed Date

Brightfield and Polarized Images of Etched CZT Defect 3



133.4 µm

Parameters

Sample Identification: Etched

Position: Quadrant 4,1

Type: Brightfield

Objective: 20X

Observations: an amorphous defect at the junction of two sets of deep scratches.

Source: Tungsten Lamp

133.4 µm

Parameters

Sample Identification: Etched

Position: Quadrant 4,1

Type: Polarized

Objective: 20X

Observations:The defect is birefringent but the scratches are not.

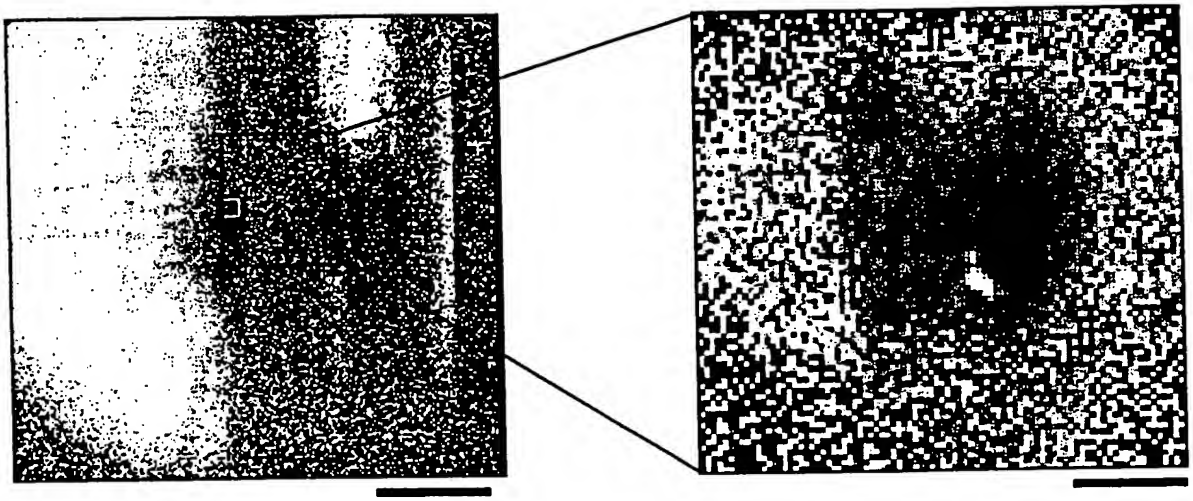
Source: Tungsten Lamp

Read and Understood By

Juliana M. Pilon — 5/24/99 — Date

Signed — 5/24/99 — Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Etched CZT Defect 3



Parameters

Sample Identification: Etched

Position: Quadrant 4,1

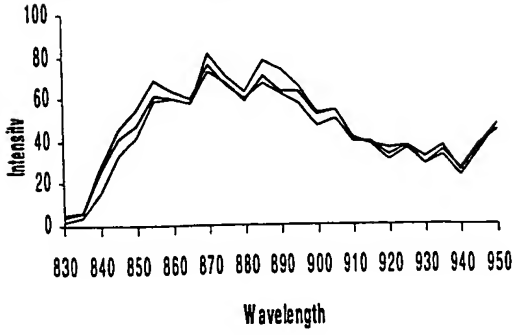
Type: NIR

Wavelength: 855 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp



Parameters

Sample Identification: Etched

Position: Quadrant 4,1

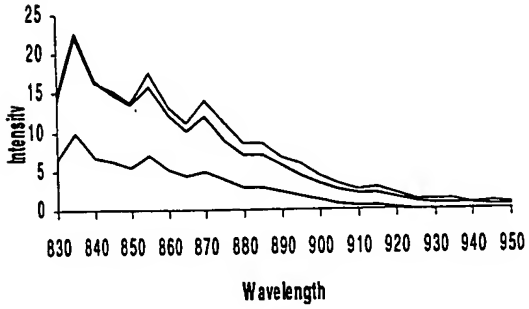
Type:Photoluminescent

Wavelength:805 nm

Objective: 20X

Observations:A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



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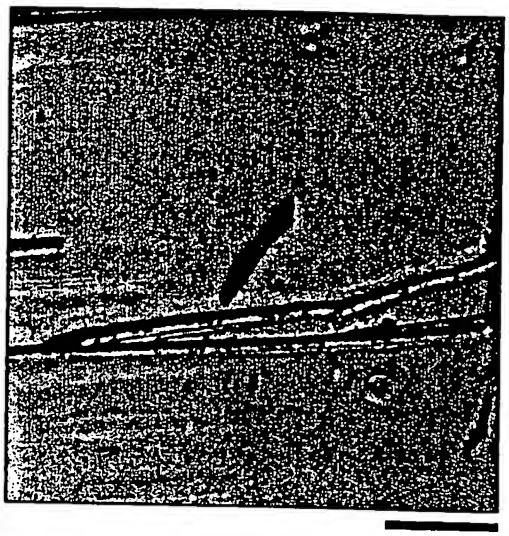
Continued on Page

Read and Understood By

Juliana M. Rios — Signed — 5/29/99 — Date

Signed — Date

Brightfield and Polarized Images of Etched CZT Defect 4



133.4 µm

Parameters

Sample Identification: Etched

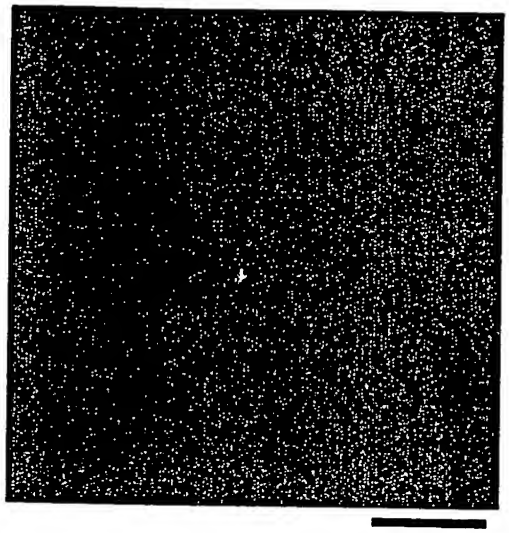
Position: Quadrant 3,0

Type: Brightfield

Objective: 20X

Observations: The defect appears as two converging scratches and an amorphous defect superior to the scratches.

Source: Tungsten Lamp



133.4 µm

Parameters

Sample Identification: Etched

Position: Quadrant 3,0

Type: Polarized

Objective: 20X

Observations:Only a portion of the amorphous defect is birefringent.

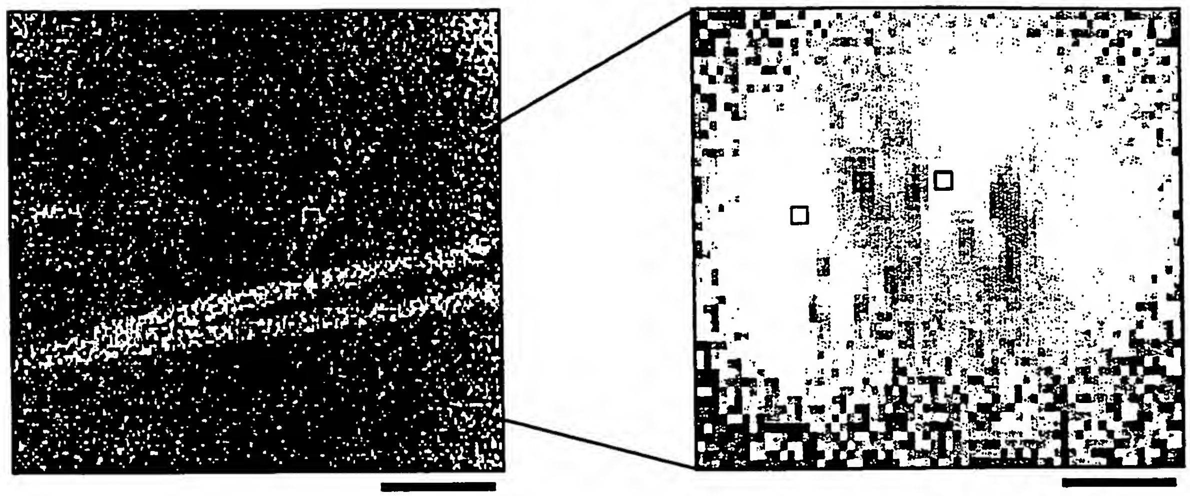
Source: Tungsten Lamp

Read and Understood By

Signed 5/24/99 Date

Signed Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Etched CZT Defect 4



Parameters

Sample Identification: Etched

Position: Quadrant 3,0

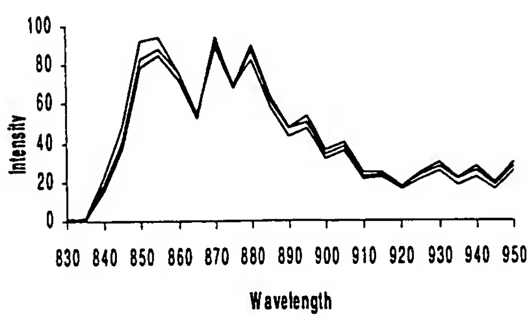
Type: NIR

Wavelength:905 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp



Parameters

Sample Identification: Etched

Position: Quadrant 3,0

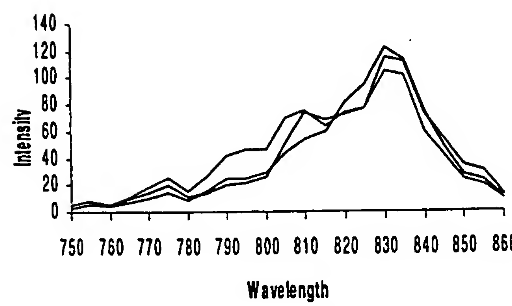
Type:Photoluminescent

Wavelength:810 nm

Objective: 20X

Observations:A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



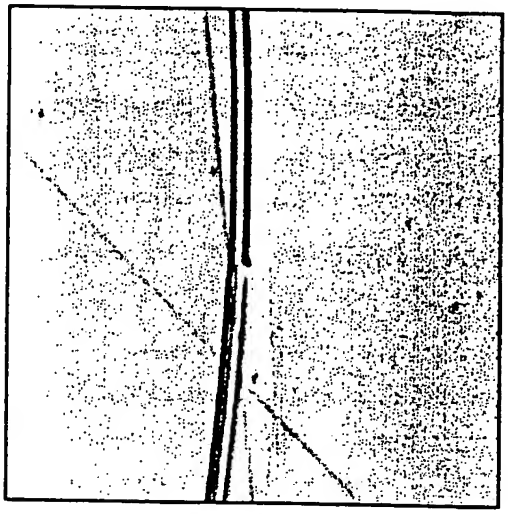
Continued on Page

Read and Understood By

Signed: Juliana M. Riley Date: 5/24/99

Signed Date

Brightfield and Polarized Images of Etched CZT Defect 5



133.4 µm

Parameters

Sample Identification:Etched

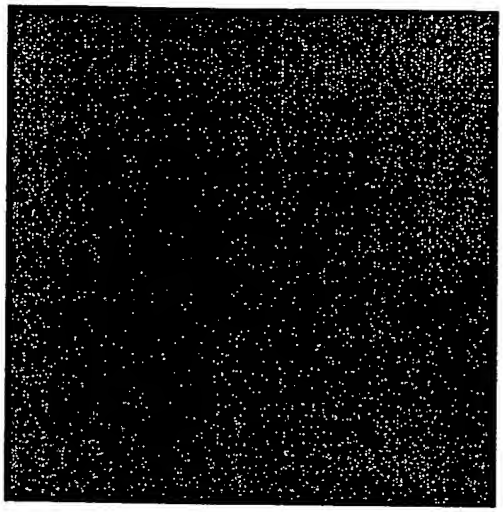
Position: Quadrant 2,2

Type: Brightfield

Objective: 20X

Observations: The defect appears as two deep scratches.

Source: Tungsten Lamp



133.4 µm

Parameters

Sample Identification:Etched

Position: Quadrant 2,2

Type: Polarized

Objective: 20X

Observations: The image doesn't reflect the birefringent nature of the diagnal scratch across the bottom left corner.

Source: Tungsten Lamp

Read and Understood By

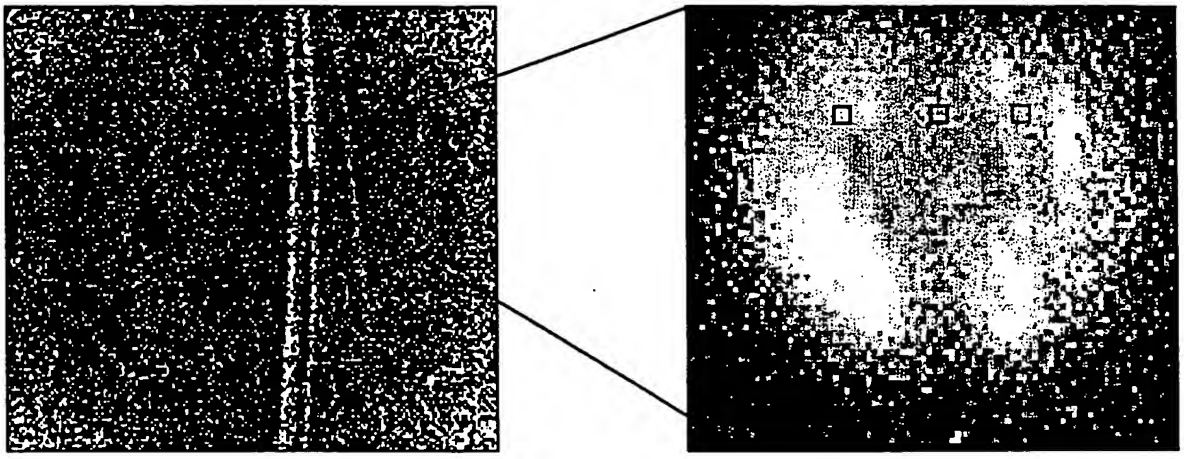
Juliana M. Ribar
Signed

5/24/99
Date

Signed

Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Etched CZT Defect 5



38.8 µm

14.6 µm

Parameters

Sample Identification: Etched

Position: Quadrant 2,2

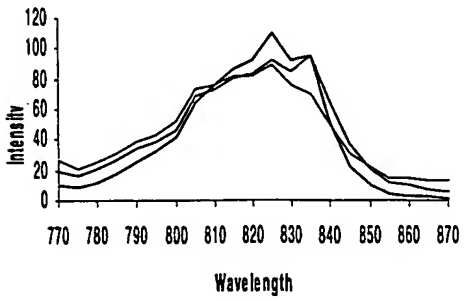
Type: NIR

Wavelength: 910 nm

Objective: 20X

Observations:The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp



Parameters

Sample Identification: Etched

Position: Quadrant 2,2

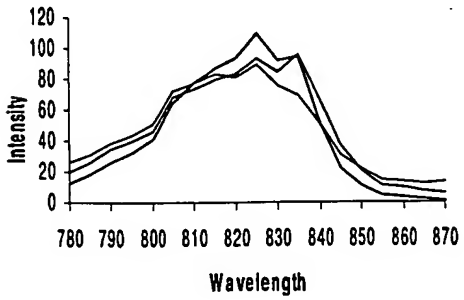
Type:Photoluminescent

Wavelength: 815 nm

Objective: 20X

Observations: A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp

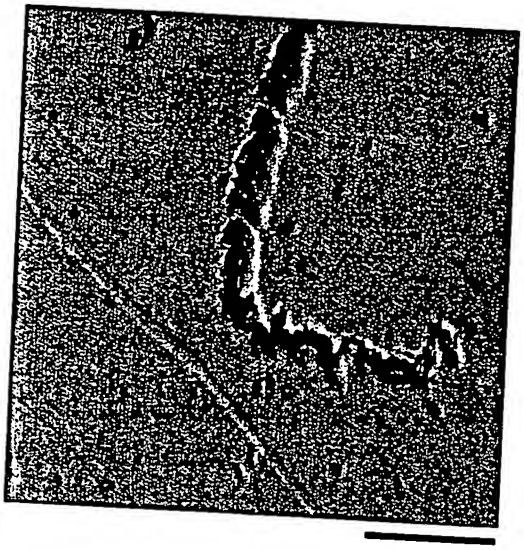


Read and Understood By

Julian M. Rhoa 5/24/99 Signed Date

Signed Date

Brightfield and Polarized Images of Unetched CZT Defect 1



Parameters

Sample Identification: Unetched

Position: Quadrant 2,3

Type: Brightfield

Objective: 20X

Comments: The defect has a lattice like structure.

Source: Tungsten Lamp

Parameters

Sample Identification: Unetched

Position: Quadrant 2,3

Type: Polarized

Objective: 20X

Observations:The defect is more bifringent at some points than at others.

Source: Tungsten Lamp

Read and Understood By

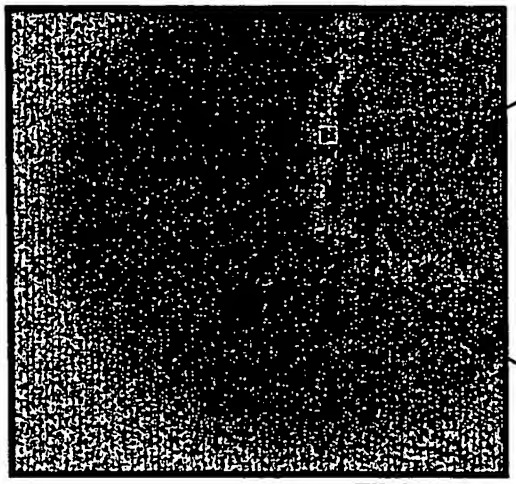
Juliann M. Pilar
Signed

5/24/99
Date

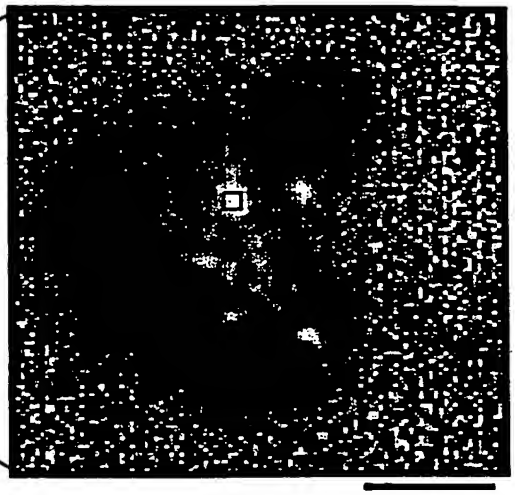
Signed

Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 1



85.7 µm



24.8 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 2,3

Type: NIR

Wavelength: 920 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp

Parameters

Sample Identification: Unetched

Position: Quadrant 2,3

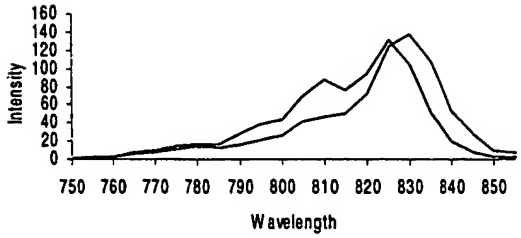
Type:Photoluminescence

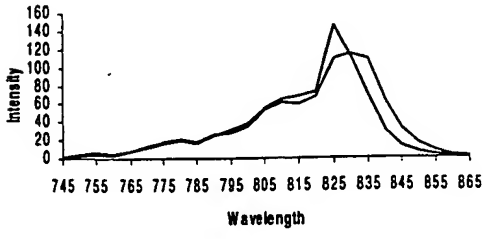
Wavelength: 840 nm

Objective: 20X

Observations: A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp





Read and Understood By

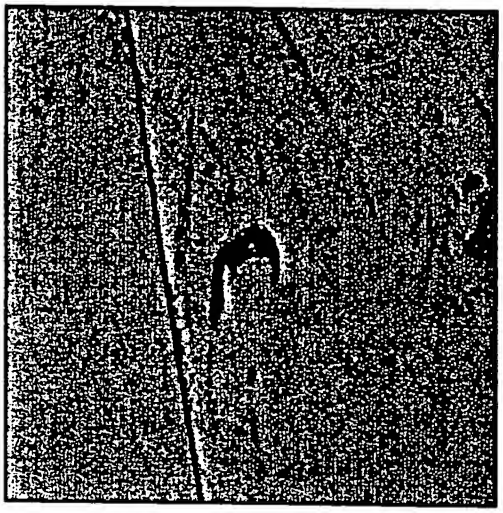
Juliana M. Piñon
Signed

5/24/99
Date

Signed

Date

Brightfield and Polarized Images of Unetched CZT Defect 2



133.4 µm

Parameters

Sample Identification: Unetched

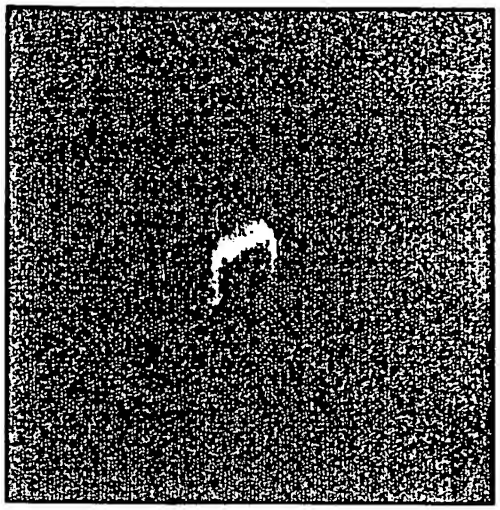
Position: Quadrant 3,4

Type: Brightfield

Objective: 20X

Observations:The defect has an amorphous shape.

Source: Tungsten Lamp



133.4 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 3,4

Type: Polarized

Objective: 20X

Observations:The defect appears to be birefringent.

Source: Tungsten Lamp

Read and Understood By

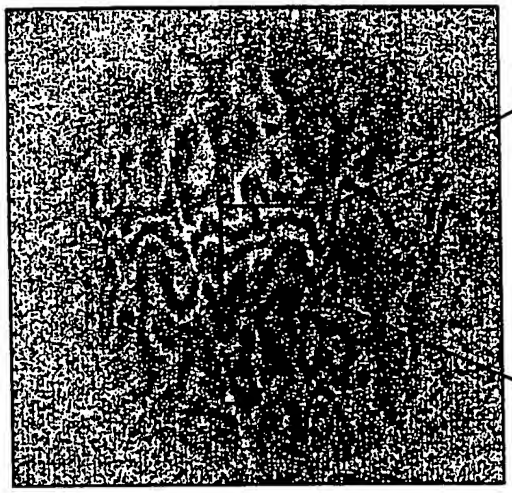
Julian M. Ribar
Signed

5/24/99
Date

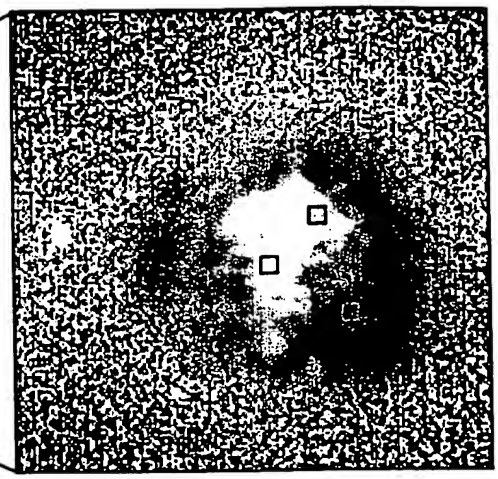
Signed

5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 2



40.2 µm



91.7 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 3,4

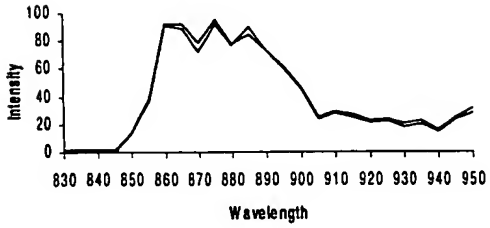
Type: NIR

Wavelength:950 nm

Objective: 20X

Observations:The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp



Parameters

Sample Identification: Unetched

Position: Quadrant 3,4

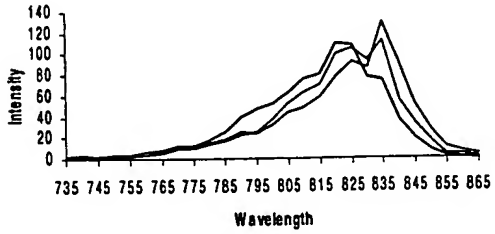
Type:Photoluminescence

Wavelength: 840 nm

Objective: 20X

Observations:A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp

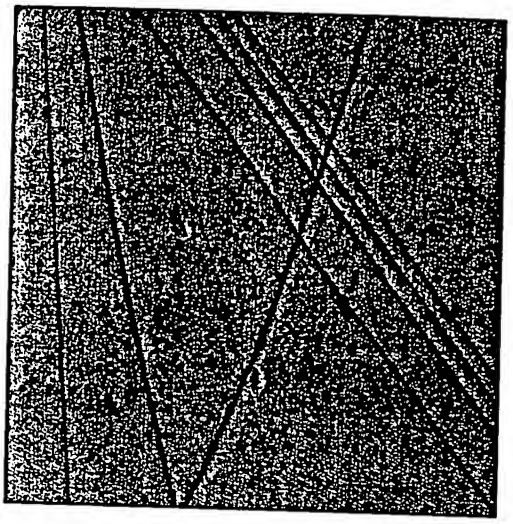


Read and Understood By

Juliana M. Rubio — Signed — 5/24/99 — Date

Signed — Date

Brightfield and Polarized Images of Unetched CZT Defect 3



133.4 µm

Parameters

Sample Identification: Unetched

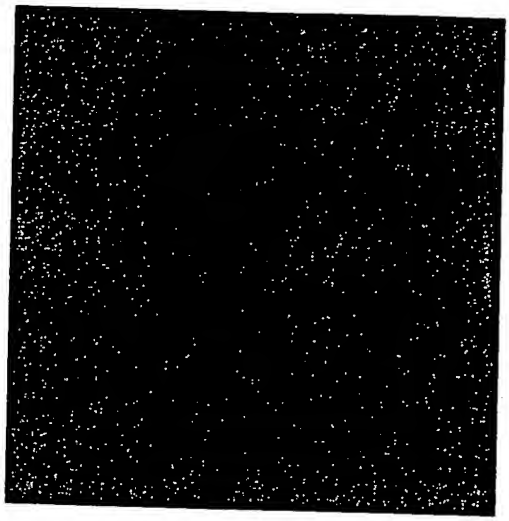
Position: Quadrant 2,1

Type: Brightfield

Objective: 20X

Observations:The defects are seen as shallow scratches.

Source: Tungsten Lamp



133.4 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 2,1

Type: Polarized

Objective: 20X

Observations:Some of the defects are birefringent.

Source: Tungsten Lamp

Read and Understood By

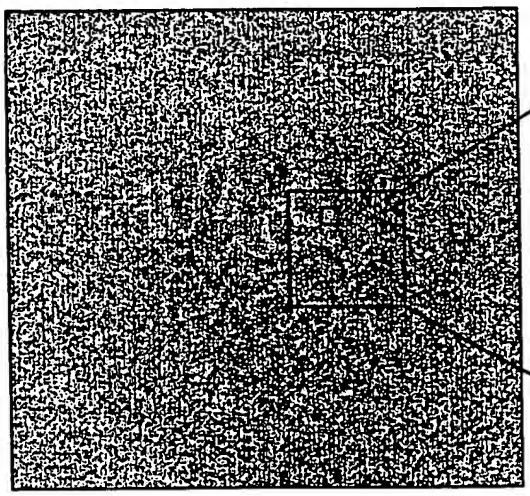
Juliana M. Pilar
Signed

5/24/99
Date

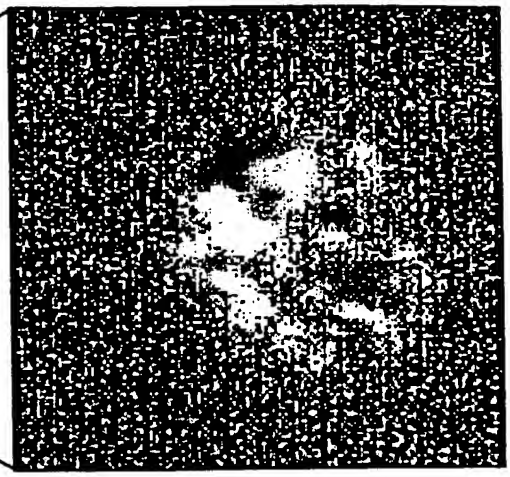
Signed

Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 3



106.5 µm



26.0 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 2,1

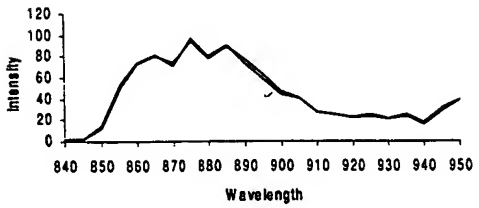
Type: NIR

Wavelength: 935 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp



Parameters

Sample Identification: Unetched

Position: Quadrant 2,1

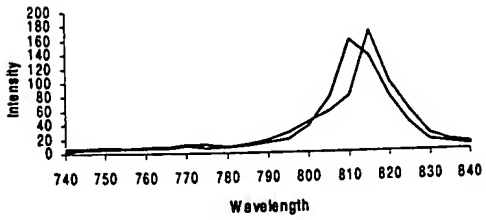
Type:Photoluminescence

Wavelength: 800 nm

Objective: 20X

Observations:A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



Read and Understood By

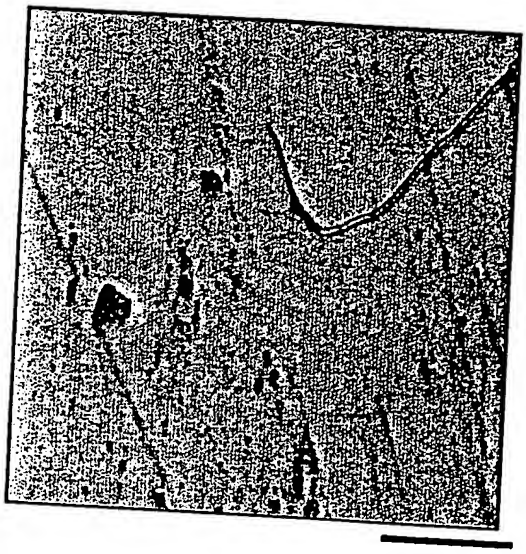
Juliana M. Pelaez
Signed

5/24/99
Date

Signed

5/24/99
Date

Bri_htfield and Polarized Images of Unetched CZT Defect 4



133.4 µm

Parameters

Sample Identification: Unetched

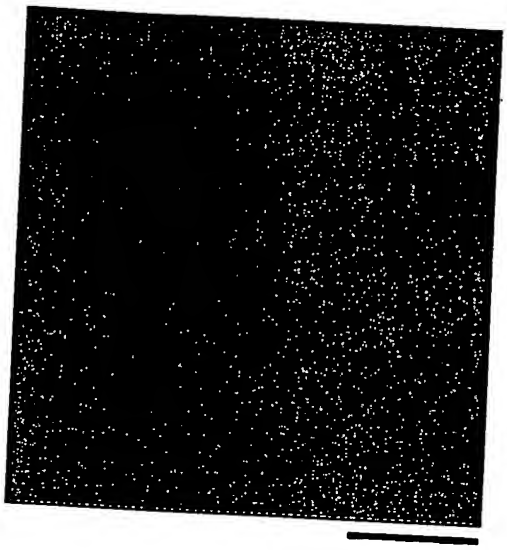
Position: Quadrant 3,2

Type: Brightfield

Objective: 20X

Observations: The defect appears as two converging scratches.

Source: Tungsten Lamp



133.4 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 3,2

Type: Polarized

Objective: 20X

Observations:The scratches are faintly birefringint.

Source: Tungsten Lamp

Continued on Page

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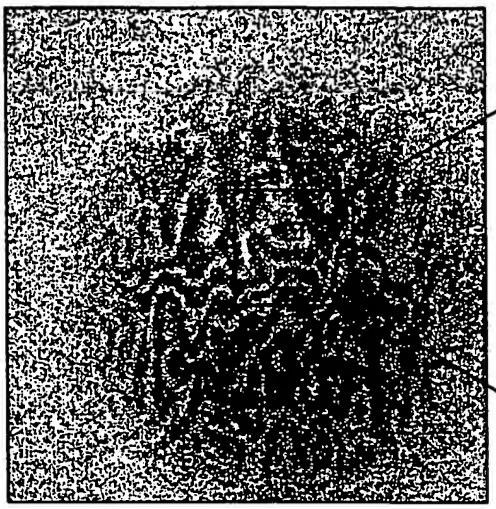
Signed

5/24/99
Date

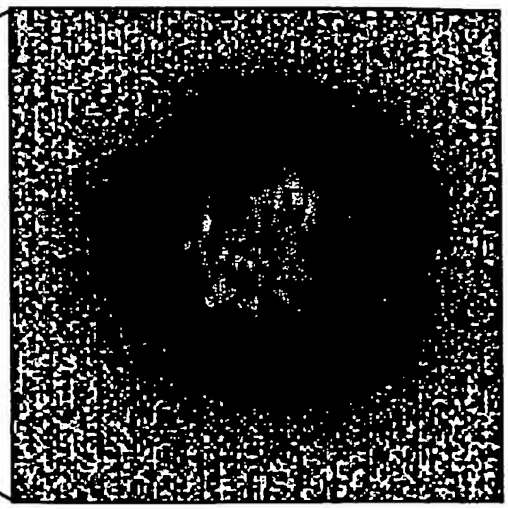
Signed

5/24/99
Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 4



106.5 µm



32.3 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 3,2

Type: NIR

Wavelength: 950 nm

Objective: 20X

Observations: The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp

Parameters

Sample Identification: Unetched

Position: Quadrant 3,2

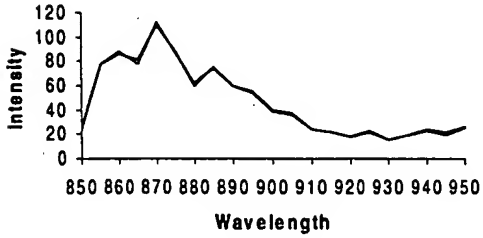
Type:Photoluminescence

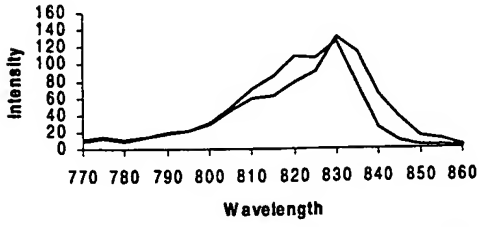
Wavelength: 845 nm

Objective: 20X

Observations:A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp





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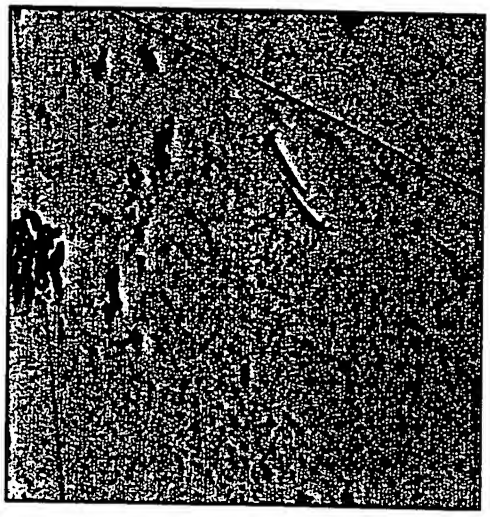
Juliana M. Rivas
Signed

5/24/99
Date

Signed

5/24/99
Date

Brightfield and Polarized Images of Unetched CZT Defect 5



133.4 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 4,3

Type: Brightfield

Objective: 20X

Observations: The defect appears as two deep scratches.

Source: Tungsten Lamp

133.4 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 4,3

Type: Polarized

Objective: 20X

Observations: The defect appears to be birefringent.

Source: Tungsten Lamp

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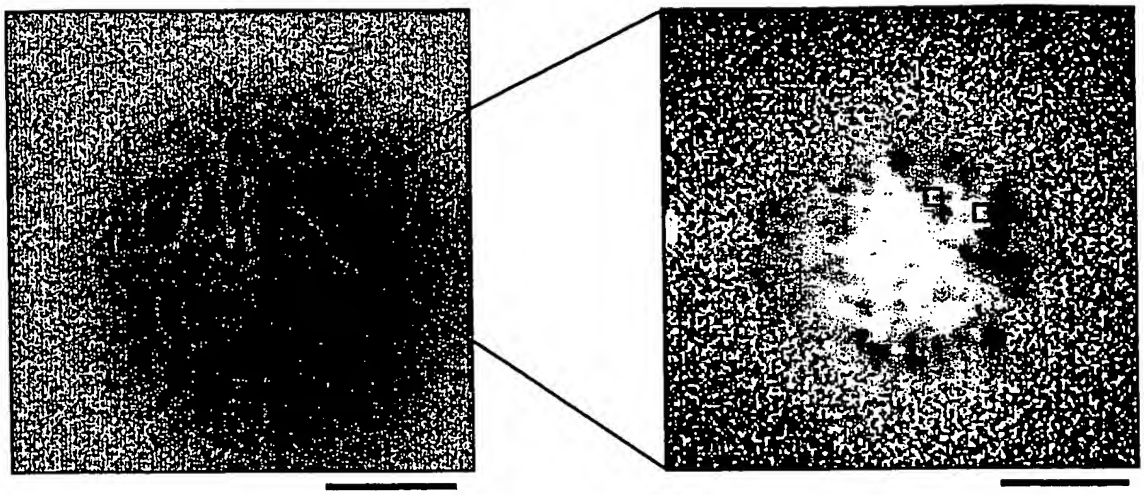
6/24/99
Date

Signed

Date

NIR and Photoluminescent Cosine Correlated LCTF Microspectra of Unetched CZT Defect 5



106.5 µm

35.6 µm

Parameters

Sample Identification: Unetched

Position: Quadrant 4,3

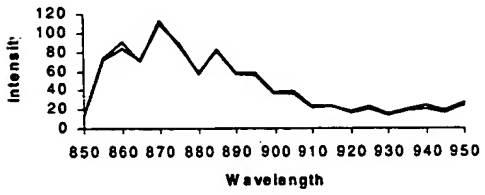
Type: NIR

Wavelength: 940 nm

Objective: 20X

Observations:The defect has a similar NIR spectrum as the surrounding area.

Source: Tungsten Lamp



Parameters

Sample Identification: Unetched

Position: Quadrant 4,3

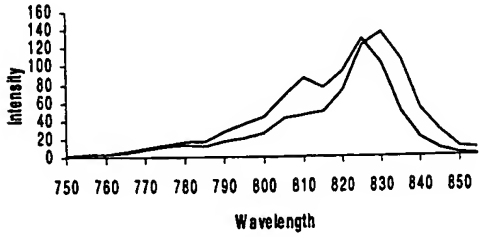
Type:Photoluminescence

Wavelength: 835 nm

Objective: 20X

Observations: A peak-shift change was noticed between points taken on and off the defect.

Source: Tungsten Lamp



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Continued on Page

Read and Understood By

Juliana M. Ribar — Signed — 5/24/99 — Date

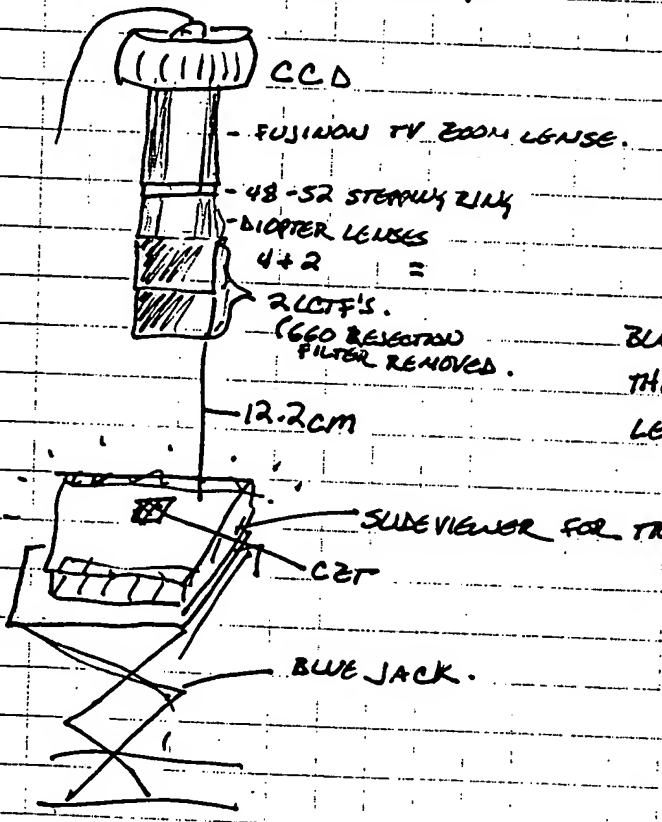
Signed — 5/24/99 — Date

PROJECT Chiom

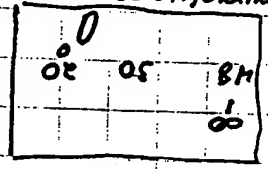
DATE	#	BLUE JACK	BJ+CZT	SPEC 825	LCTF 820	LCTF 825	LCTF 830
0701	010	✓	✓	✓	✓		
0701	~~016~~ 011		✓	✓	✓		
0701	012	✓		✓		✓	
0701	013		✓	✓		✓	
0701	014	✓		✓			✓
0701	015		✓	✓			✓

July 2, 1999

★ CONFIGURATION CHANGE.



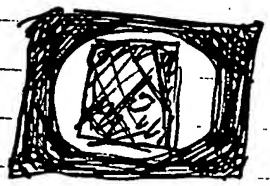
LENSE CONFIGURATION



CZT-9688 B-SOAK etch

BLACK ELECTRICAL TAPE USED TO SEAL THE JOINT BETWEEN THE FUJINON TV ZOOM LENSE AND THE DIOPTER LENSE.

• 990702_jonr_001.SPE



BRIGHT FIELD IMAGE Δt 2 SEC BIX1
LCTF - ~~800~~ 800 TUNGSTEN LAMP
CZT ON LIGHT BOARD (NOT LIT)

99

Continued on Page

Read and Understood By

Juliana M. Ralon. — Signed
07/06/99 — Date
Signed
Date

IMAGES 003 (FRONT SIDE OF SAMPLE) AND 007 (BACK SIDE OF SAMPLE) WERE DIVIDED BY 004 = LIGHT SOURCE.

SUMMARY OF IMAGES FOR 990827.

001	BRIGHT FIELD REFLECTANCE - 2 TUNGSTEN LAMPS - FRONT OF SAMPLE.	
002	TRANSMITTANCE 805-865 2nm STEP 1 SEC ΔT - FRONT. BAD IMAGE	
003	002 GOOD VERSION 1 SEC - FRONT ★	
004	LIGHT BOARD ONLY - ΔT 1 SEC	
005	ΔT 500 ms - FRONT	012 - B.F.
006	ΔT 100 ms - FRONT	003, 007 GOOD
007	ΔT 1 SEC BACK SIDE OF SAMPLE (ALSO POLISHED) ★	
008	ΔT 500 ms - BACK	
009	ΔT 100 ms - BACK	
010	SAMPLE MOVED ΔT 1 SEC	
011	RESOLUTION TARGETS.	
012	BRIGHT FIELD REFLECTANCE. (700nm)	

THE REST OF THE IMAGES WERE PRODUCED THROUGH ANALYSIS OR DIVISION STUDIES.

Microsystem. Wednesday, September 8, 1999

★ 11-15-99 ALL THE FILES OF 9-8-99 WERE TRANSFERRED TO MOTHRA/SHARED/CLIENTS/TEPPETS/CCD

0 → ALL THE WAY
30 ← ALL THE WAY
~~ALL THE WAY~~

HELPS TO CREATE A LARGE FIELD OF VIEW.

OBJECTIVE TYPE - OLYMPUS (JAPAN) F9-102328 LC 20
MSPlan 0.46 ∞/0 f=180
MICROSCOPE: OLYMPUS BH-2

Continued on Page

Read and Understood By

Julian M. Ribon. Signed 9/7/99 Date [illegible] Signed 9/7/.. Date

PROJECT Micro System.

Continued From Page

LAB04 // C:/CLIENTS/MICRO/

990809_jmr_001_RESJAG.tif IMAGE RESOLUTION TARGET OF MICRO RES TARGET

700 LCTF ΔT 0.5 SEC -21°

TRANSMITTANCE. WWVIEW. B4X4

ROI: XSTART 218 XEND 1025 YSTART 131 YEND 946

SAMPLE ARCHIVE #448 (DESCRIPTION - 9777-C3 GROWTH TWINS II III Q 2T "EXTRAS THAT ARE BAD.")

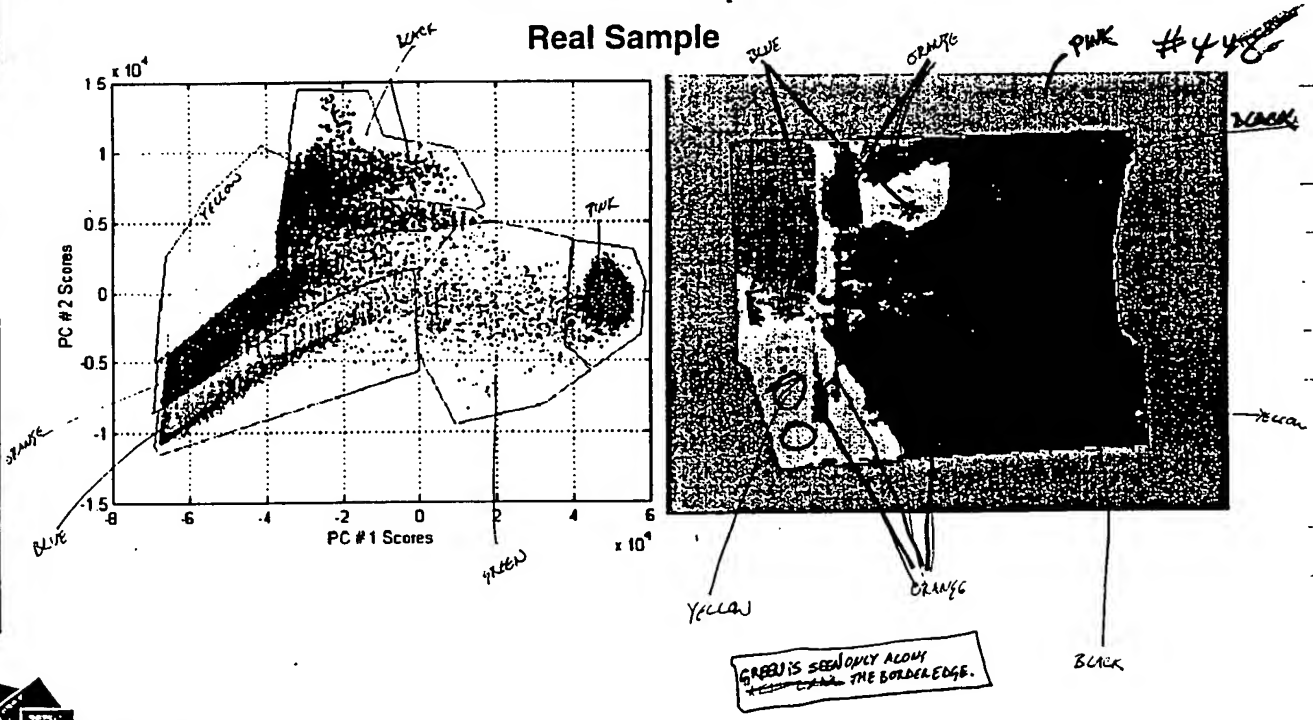
IN THIS EXPERIMENT DATA WILL BE COLLECTED FROM THE 4 REGIONS REPRESENTED BY THE COLORS BLACK, ORANGE, YELLOW AND BLUE.

Chemical Imaging for Semiconductor Metrology (CHISM)

[Zn] → ~~Te Precipitate Analysis~~ in CZT

Macro / Micro Inspection

Real Sample



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*GREEN WAS NOT TARGET BECAUSE IT PRIMARILY ENCOMPASSES THE THIN OUTER EDGE.

*PINK IS THE BACKGROUND.

115

Continued on Page

Read and Understood By

Signed	Date	Signed	Date
[signature]	8-8-99	[signature]	9/[illegible]/99

PROJECT AIV.

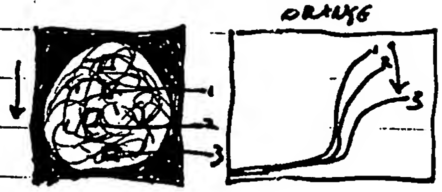
•990908_jmr-002.tif "BLACK REGION" BOTTOM RIGHT CORNER.

BLACK

ΔT 2 SEC 805-865 2nm STEP -21°
AQM 4.08 ROI Ⓣ131 Ⓑ946 Ⓛ218 Ⓡ1025
B 4X4 TRANSMITTANCE - TUNGSTEN BULB.

•990908_jmr.003.tif "ORANGE" REGION - AS MARKED.
ΔT 2SEC. (REST SAME).

ORANGE



* THE TRANSMISSION CURVE DROPS, + SHIFTS RIGHT THE FURTHER DOWN THE IMAGE PTS ARE TAKEN.
* SOME ODD GRAINS APPEAR DISAPPEAR.

•990908-jmr.004.tif "ORANGE" REGION ΔT 1sec (REST THE SAME)

ORANGE

* ODD GRAINS HAVE DISAPPEARED.

SAME.

•990908-jmr-005.tif "YELLOW" REGION ΔT 2SEC (THE REST IS THE SAME.)

~~990908_jmr.006~~

•990908_jmr.006.tif "YELLOW" REGION ΔT 1SEC

SAME.

•990908-jmr-007.tif "BLUE" REGION ΔT 2SEC

SAME

116

Continued on Page

Read and Understood By

[signature] Signed — 9-8-99 Date — [signature] Signed — 9/8/99 Date

• 990908-jmr-008.tif "BLUE" REGION ΔT 1 SEC
(OTHER PARAMETERS THE SAME.)

allow

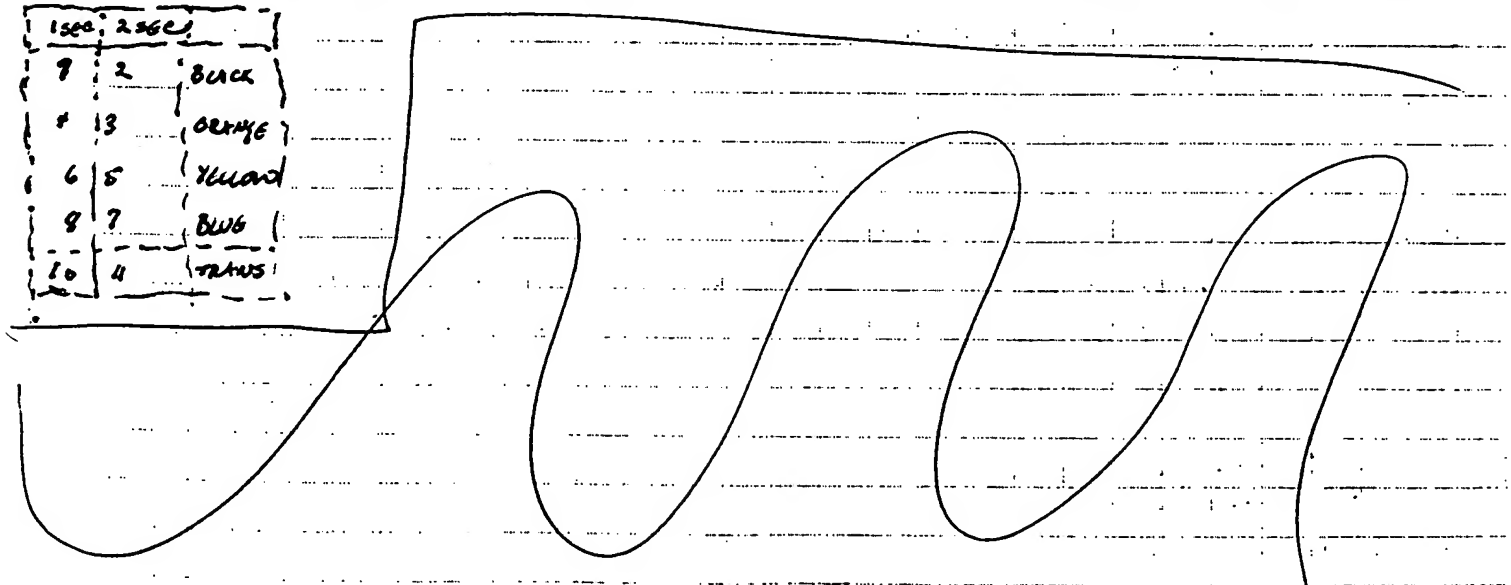
λ841

• 990908_jmr-009.tif "BLACK" REGION ΔT 1 SEC
(OTHER PARAMETERS THE SAME.

SUMMARY.

• 990908-jmr-001	RESOLUTION TARGET			
• 990908-jmr-002	BLACK REGION	2 SEC ΔT		
• 990908-jmr-003	ORANGE	2 SEC		
• 004	ORANGE	1 SEC		
• 005	YELLOW	2 SEC		
• 006	YELLOW	1 SEC		
• 007	BLUE	2 SEC		
• 008	BLUE	1 SEC		
• 009	BLACK	1 SEC		
• 010 (PINK)	TRANSMITTANCE LIGHT ONLY - NO CZT	1 SEC	RAMAN	STEP 2 805-865
• 011 (PINK)	" " " " - " "	2 SEC	RAMAN	" "

1SEC	2SEC	
9	2	BLACK
1	13	ORANGE
6	5	YELLOW
8	7	BLUE
10	4	TRANS



117

Continued on Page

Read and Understood By

Juliana M. Rilon — Signed
September 14, 1999 — Date
[illegible] — Signed
9/14/99 — Date

EXPERIMENT OVERVIEW - SEPTEMBER 14, 1999 - TUESDAY.

THE FOLLOWING SAMPLES WILL BE USED:

- #435 Tellurium PRECIPITATE 10017 Tc CZT 4% LHT HIGH DENSITY GOOD TRANS/EPD 02-03-99 13TH LAYER - POLISHED ON ONE SIDE.

Exp 1

- # 448 - 9977-C3 GROWTH TWINS "EXTRAS THAT ARE BAD."

Exp 3

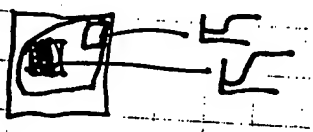
- # 472 10229-43 <111> CZT 4% LOW TRANS CORE C.S.

Exp 2

THERE WILL BE 3 EXPERIMENTS USING EACH OF THE SAMPLES.

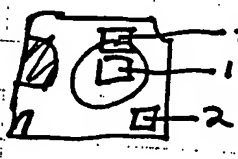
EXPERIMENT #1 Tc PRECIPITATE EXPERIMENT

THE RESEARCHER WILL SCAN ACCROSS THE ENTIRE ECTF RANGE (700-400 nm) TO DETERMINE THE TRANSMISSION EDGE PARAMETERS. 2 DATA SETS WILL BE TAKEN, ONE ON THE PRECIPITATES AND ONE OFF.



EXPERIMENT #2 CORE REGION EXPERIMENT.

IN THIS EXPERIMENT, A BROAD RANGE SCAN AND 2 DATA SETS WILL BE TAKEN, ONE SET ON THE CORE AND ONE OFF. IF THE TWO SETS DIFFER, A BOUNDARY AREA ANALYSIS DATA SET WILL BE TAKEN.



118

Read and Understood By

Juliana M. Pulsifer
Signed

9/17/99
Date

Signed

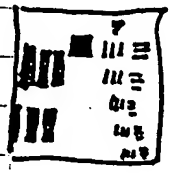
Date

Continued on Page

PROJECT: AT... TELLURIUM PRECIPITATE STUDY

CA804\\c\clients\ATI\990917\

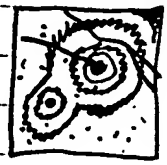
• 990917-jmr-001-res-targ.tif — RESOLUTION TARGET -20°
TRANSMITTANCE MODE. ΔT 60 SEC
B 1X1 ROI - FULL (1035 X 1317)
AT WINVIEW 32 LCTF'S - 700 nm



SPOT 1

• 990917_jmr-002.tif — BRIGHT FIELD REFLECTANCE IMAGE. ★
CZT SAMPLE # 435, LAYER 17 (POLISHED)
Te PRECIPITATE. ΔT 10 SEC. -20°
B4X4 WINVIEW 32 LCTF'S - 700nm

★ NOTE 11-8-99
"ETALONING" EFFECT
DUE TO MAGIC MARKS
ON THE SURFACE

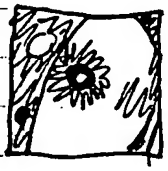


• 990917-jmr-003.tif — B4X4 ΔT 120 SEC (2 MIN) LCTF - 900nm
-20° WINVIEW. BF REFLECTANCE.

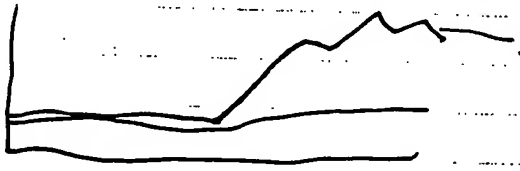
• HALO SURROUNDING THE TWO PARTICLES MUCH WIDER THAN + ~~DIFFUSED~~ MORE DIFFUSE THAN IN 002.

• 990917-jmr-004.tif/calico — B4X4 ΔT 10 SEC LCTF 700-1100nm STEP 10
(41 FRAMES) -20° WINVIEW AQM BF REFLECTANCE.

• 990917-jmr-005.tif/calico — B4X4 ΔT 30 SEC LCTF 805-865 STEP 2
(31 FRAMES) -20° AQM 5.0 TRANSMITTANCE.
★ TRANSMITTANCE EDGE AT 847 nm



861 nm



Continued on Page

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Juliana M. Rita — Signed — 9/17/99 — Date

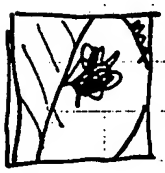
Signed — Date

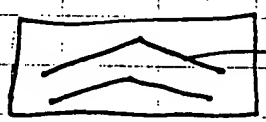
• 990917-jmr-006.tif/allco 805-865 850-860 STEP 5 (3 FRAMES) ΔT 1 MIN TRANSMITTANCE -20° BYX4 AQM 5.0.

A BIT SHARPER THAN 005

(THE SIGNAL IS VERY LOW (200 LUX) SO B TP)

• 990917-jmr-007.tif/allco 850-860 STEP 5 B8X8 ΔT 1 MIN (3 FRAMES) -20° AQM 5.0 TRANSMITTANCE.





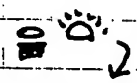
INSIDE PRECIPITATE.

SPOT 2

• 990917-jmr-005.tif 700nm ΔT 1SEC B4X4 -20° WINVIEW.

↑ REFLECTANCE

0 DF



• 990917-jmr-009.tif/allco 840-870nm STEP 5 B8X8 TRANSMITTANCE ΔT 2 min

SPOT 3

• 990917-jmr-010.tif 700nm 1SEC -20 B 4X4 DF REFLECTANCE

* HUGE PARTICLE. LINES SURROUNDING PARTICLE RESEMBLE MAGNETIC ~~LINES~~ FIELDS FLOWING THROUGH AN OBJECT WITH POLES, SUCH AS THE EARTH.

ETALONING EFFECT.

• 990917-jmr-011.tif 840-870nm STEP 5 TRANSMITTANCE B8X8 ΔT 2MIN.

120

Continued on Page

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Juliana M. Rt. — Signed

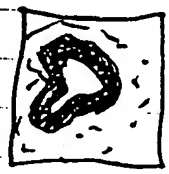
9/17/99 — Date

Signed

Date

SPOT 4

• 990917_jmr_012.tif 700nm 1SECΔT -20° B4X4 REFLECTANCE



• 990917_jmr_013.tif 840-870nm STEP 5 B8X8 -20° AQM 5.0 ΔT 2MIN TRANSMITTANCE

SUMMARY 9/17/99

• 001 - TEST TARG				STEP		
002 -	SPOT 1	REFLECTANCE	700nm	B4X4	10SEC	
003 -	SPOT 1	REF	900nm	B4X4	2 MIN	
004 -	SPOT 1	REF	700-1100 10	B 4X4	10 SEC	EXPERIMENTS WITH EXPOSURE TIMES & BINNING PARAMETERS TO DETERMINE THE BEST SETTINGS
• 005 -	SPOT 1	TRANS	805-865 2	B 4X4	30 SEC	
006 -	SP 1	TRANS	850-860 5	B ~~8X8~~ 4X4	1 MIN	
007 -	SP 1	TRANS	850-860 5	B8X8	1MIN	
008 -	SP 2	REF	700nm	B 4X4	1SEC	
009 -	SP 2	~~REF~~ TRANS	840-870 5	8X8	2MIN	
010 -	SP 3	REF	700nm	B4X4	1SEC	
011 -	SP 3	TRANS	840-870 5	B8X8	2MIN	
012 -	SP 4	REF	700nm	B4X4	1SEC	
013	SP 4	TRANS	840-870 5	B8X8	2MIN.	

Continued on Page

Read and Understood By

Signed 9/20/99 Date

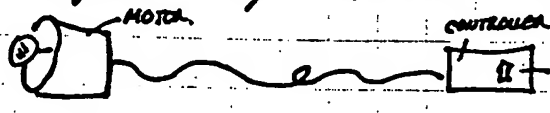
Signed 9/20/99 Date

PROJECT ATP - GRAN CORE REGION - S:CCD

Tuesday, September 28, 1999 — ALL 9-28-99 FILES MOVED TO MOTHRA 11-16-99

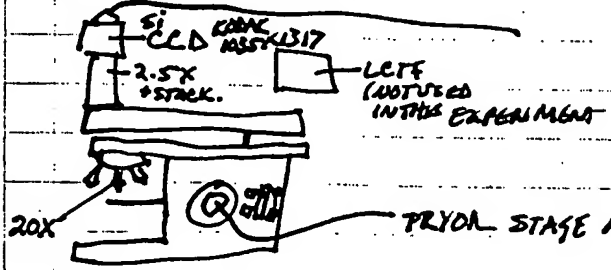
- 990928_jmr_001.tif — 1FRAME. AT 1 MIN (HALF POWER LIGHTING) ON CORE REGION #472 675nm B4X4 AQM 5.0 -30° BF REFLECTANCE
- 990928_jmr_002/alloo.tif — 21 FRAMES AT 1MIN (FULL POWER) ON CORE REGION (SAME POSITION AS 001) #472 700-1100nm 20nm STEP B4X4 AQM 5.0 -30 TRANSMITTANCE.
- 990928_jmr_003.tif — 1FRAME AT 1MIN (HALF POWER LIGHTING) OFF CORE #472 700nm B4X4 AQM 5.0 -30° REFLECT.
- 990928_jmr_004/alloo.tif — 21 FRAMES AT 1MIN (FULL POWER) OFF CORE (SAME POSITION AS 003) #472 700-1100nm 20nm STEP B4X4 AQM 5.0° -30° TRANSMITTANCE
- 990928_jmr_005.tif — 1 FRAME AT 1MIN (HALF POWER LIGHTING) BORDER CORE #472 700nm B4X4 AQM5.0 -30 BF REFLECT.
- 990928_jmr_006.tif/alloo — 21 FRAMES AT 1MIN (FULL POWER) BORDER 700-1100nm 20nm STEP #472 SAME POSITION AS 005. B4X4 AQM 5.0 -30° RE TRANSMITTANCE.

Tuesday, October 12, 1999. - Most of the morning was spent troubleshooting the 3-D MOTOR.



AT THE PRESENT MOMENT, THE STAGE MOTOR ONLY RESPONDS RANDOMLY TO ½ OF THE COMMANDS SENT TO IT.

PRESENT CONFIGURATION . . .



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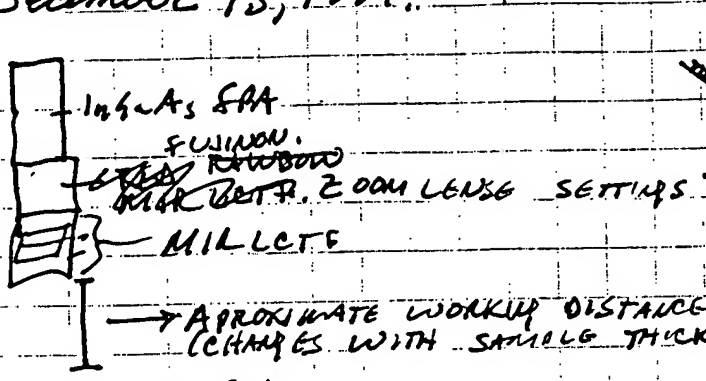
Juliana M. Rivera — Signed — Oct. 12, 1999 — Date

[illegible] — Signed — [illegible] — Date

PROJECT ATP-MACRO-A $CaCO_3$

December 13, 1999.



DIOPTER LENSES: 4X + 4X + 2X = 10X

2 INCHES.

ALL IMAGES SCANNED FROM 1000-1700nm STEPS 10nm. 2 TUNGSTEN BULBS. 4QM 4.0 TRANSMISSION MODE. SAMPLES PLACED ON PLASTIC STAGE.

- 991213_jmr_001_asp_CaCO3.TRANS. del — asp & $CaCO_3$ TABLET. + STRAY LIGHT WSYS.
- 991213_jmr_002_asp-CaCO3_TRANS. del — asp / $CaCO_3$ TABLET. + STRAY LIGHT.
- 991213_jmr_003_asp_CaCO3_TRANS: — WHOLE TABLET. BEST IMAGE of $CaCO_3$ + ASPRIN TABLET.
- 991213_jmr_004_LIGHT_TRANS. — 2 TUNGSTEN BULBS. - STAGE REMOVED. NOTHING BETWEEN LOTE'S + BULBS.
- 991213_jmr_003 DIV 004 del — DIVIDED IMAGE.
- 991213_jmr_003 DIV 004_ND:m del — PCA 1-6 NO NORMALIZATION. ☆ INTERESTING.
- 991213_jmr_005_asp_TRANS. — WHOLE TABLET. ASPRIN (SELF-MADE).
- 991213_jmr_005 DIV 004 del — DIVIDED IMAGE
- 991213_jmr_005 DIV 004_ND:m del — PCA 1-6 NO NORMALIZATION

- STAGE MOVED -

- 991213_jmr_006_CaCO3_TRANS. — WHOLE TABLET $CaCO_3$. (MADE w/ MEOH) TABLET TO MAKE COMPACT
- 991213_jmr_007_LIGHT_TRANS. do — (NEW LIGHT SOURCE TAKEN).
- 991213_jmr_006 DIV 007 del — DIVIDED / MAGIC
- 991213_jmr_006 DIV 007_ND:m del — PCA 1-6, NO NORMALIZATION.

☆ THESE IMAGES WERE DIVIDED BY A LIGHT IMAGE W/ NO BASEPLATE. THEY WERE DELETED, A NEW BACKGROUND WAS TAKEN W/ BASEPLATE) + NEW ANALYSIS COMPLETED.

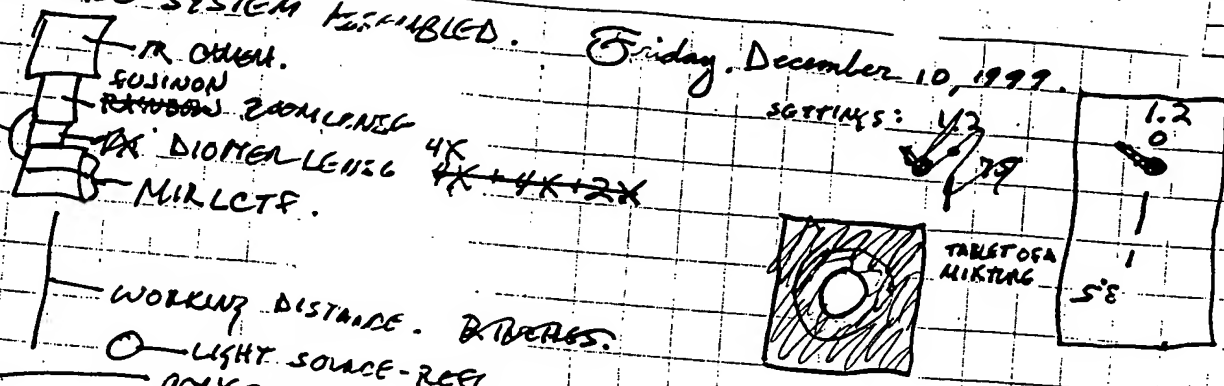
Continued on Page

170

Read and Understood By

Fabian M. Rhen — Signed
12-13-99. — Date
Signed
1/31/00 — Date

NIR-LO SYSTEM ASSEMBLED. Friday. December 10, 1999.



ALL IMAGES SCANNED FROM 1000-1700nm w/10nm STEPS.
TUNGSTEN BULBS (2) USED FOR ALL IMAGES BUT DARK. MACRO

- ~~991210-jmr-001-DARK.~~ ~~DARK TARGET~~
- 991210-jmr-001_RES_TRG RES TARGET - TRANS MODE
- 991210-jmr-002-LIGHT-TRANS.tif LIGHT IMAGE. NO SAMPLE. TRANSMITTANCE MODE
- 991210-jmr-003-ASP.NaCit.TRANS.tif ASP, NaCit. 50/50 TABLET. TRANS. MODE. - SAMPLE ADDED WHOLE
- 991210-jmr-004-ASP.NaCit.REFL.tif ASP, NaCit 50/50. TABLET WHOLE. REFL MODE - LIGHT SOURCE ONLY MOVED.
- 991210-jmr-005-LIGHT.REFL.tif - SAMPLE REMOVED. NOT MOVING LAMPS. TUNGSTEN SOURCE. REFL MODE
- 991210-jmr-006-DARK.tif DARK IMAGE.
- 991210-jmr-007-ASP-CACO3-REFL.tif - SAMPLE ADDED. $CaCO_3$ + ASP RUN 50/50 TABLET. REFLECTANCE, (LIGHT SOURCE NOT MOVED)
- 991210-jmr-008-ASP-CACO3.TRANS.tif - LIGHT MOVED ~~LIGHT MOVED~~ CACO3 + ASP 50/50 TABLET. TRANS.
- 991210-jmr-009-~~LIGHT ASP-CACO3~~-TRANS.tif - SAMPLE REMOVED - LIGHTS NOT MOVED. LIGHT ONLY. TRANS.

003 DIV 002 - ASP, NaCit TRANS.
004 DIV 005 ASP, NACIT, REFL.
007 DIV 005 ASP, CACO3, REFL
008 DIV 009 ASP, CACO3, TRANS.

NO WOLFRAM HALOGEN.
PCA 1-6 QUICKCOS, COSINE
PCA 1-6 QUICKCOS, COSINE
PCA 1-4 QUICKCOS, COSINE
PCA 1-6 QUICKCOS, COSINE

Continued on Page

169

Read and Understood By

Fabian M. Pitt
Signed

12-13-99
Date

Signed

12/13/99
Date

February 28, 2000. Monday.

SiC wafer testing - Micro NIR System (ONR)

- 000228_jmr_01_SiC spot 1 R.tif — SiC wafer (#444) REFL MODE. TUNGSTEN FULL POWER
  
  "LADDER".
  * COLLECTING IR DATA WHERE RAMAN DATA HAD BEEN COLLECTED.
  1000-1700 nm 10 nm STEPS. 71 FRAMES.
  InGaAs IR 20X. MIRRORS. ΔT 16ms
  SPOT 1 10,281 KB 10 AVG.

- 000228_jmr_02_SiC spot 1 T.tif — SiC WAFER 444 TRANS MODE. TUNGSTEN. 3 BARS
  
  1000-1700 nm 10 nm STEPS. 71 FRAMES.
  InGaAs IR 20X MIRRORS. ΔT 16ms SPOT 1 10 AVG.

Continued on Page

Read and Understood By

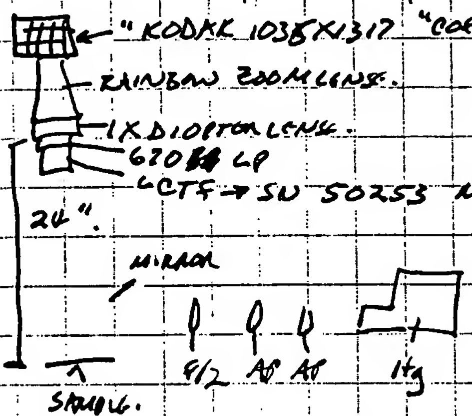
Julian M. Rta. — Signed — March 1, 2000. — Date

Signed — Date

PROJECT MACRO NIR. - ATP

MACRO SYSTEM. CONFIGURATION.

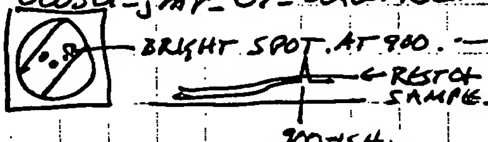
OBJECTIVE: TO VIEW PL ACTIVITY IN THE IR REGIONS.



• 000301-jmr-06-CZT.DEFECT poor CZT # 438 → AREA W/NO VISIBLE DEFECTS.

ROI: T 325, L 625, B 625, R 900 B 1X1
ΔT 30 SEC 700-1100nm, 10nm STEPS.
PCA, CCA, CCA0PCA.

• 000301-jmr-07-DEFECT RICH CZT # 439 → FULL OF DEFECTS.

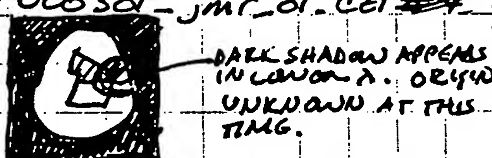


→ SPOT APPEARS TO NAKED EYE A SHADE DARKER THAN THE BULK MATERIAL.

TOO ~~MUCH~~ MANY COSMIC ~~EFFECTS~~ EVENTS DUE TO ↑ΔT

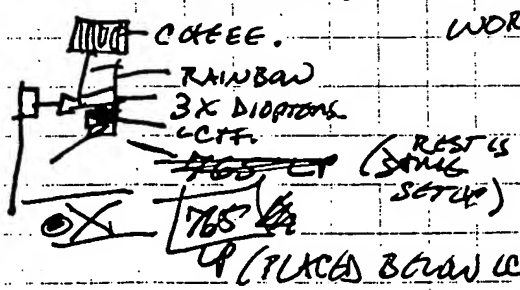
Thursday, March 2, 2000. ∴ ↓ΔT, ↑B

• 000301-jmr-01-CZT ~~#~~ 438 CZT # ~~438~~ 438 SMALL 2" SQUARE PIECE.



2 GRAIN DIRECTIONS. ROI: T 150, L 100, B 1000, R 875
B 4X4, ΔT 5 SEC 675-1100nm @ 5nm ≈ 86 FRAMES.

→ NEW CONFIG.



WORKING DISTANCE: 19½"
SAMPLE → COMPASS.

LCTF # 50253

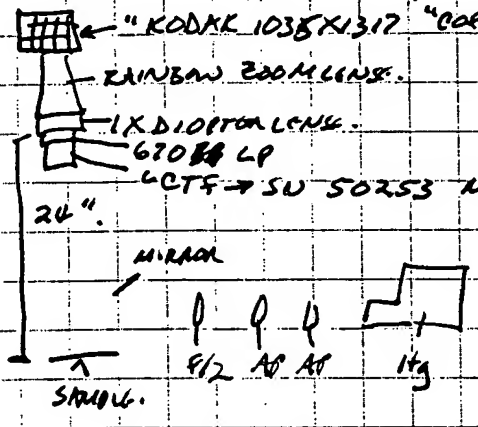
Continued on Page

177 Read and Understood By

[signature] 3 2 00

Signed Date Signed Date

MACRO SYSTEM CONFIGURATION.



OBJECTIVE: TO VIEW PL ACTIVITY IN THE IR REGIONS.

• 000301-jmr_06_CZT_DEFECT poor CZT # 438 → AREA W/NO VISIBLE DEFECTS.

ROI: T 325, L 625, B 625, R 900 B 1X1

ΔT 30 SEC 700-1100nm, 10nm STEPS.

PCA, CCA, CCAOCA.

• 000301-jmr_07_DEFECT RICH CZT #439 → FULL of DEFECTS.

TOO MANY COSMIC EVENTS DUE TO ↑ΔT

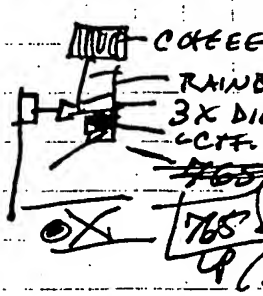
Thursday, March 2, 2000. ∴ ↓ΔT, ↑ B

• 000301-jmr_01_CZT BULK 438 CZT # 438. SMALL 2" SQUARE PIECE.

2 GRAIN DIRECTIONS. ROI: T 150, L 100, B 1000, R 875

B 8X4, ΔT 5 SEC 675-1100nm @5nm 386 FRAMES

→ NOW CONFIG.



WORKING DISTANCE: 19 1/2"

SAMPLE → LONGPASS.

LCTF # 50253

Continued on Page

177

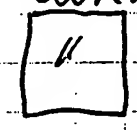
Read and Understood By

Signed — Date — Signed — Date

3200

• 000228-jmr-03-Si2 SPOT 2 T.tif

INTERESTING DATA.
THE SIDES BECOME LIGHTER/DARKER W/ DIFFERING λ's.
Si C WAFER 444. TRANS MODE. SPOT 2 3 LIGHT BARS. 1000-1700 nm 10 nm STEPS. 7 IFRAMES. InGaAS, IR20X, MIRLCTF. ΔT 16MS. 10 AVG.

• 000226-jmr-04-Si2 SPOT 2 R.tif

Si C WAFER 444 SPOT 2. FULL LIGHT. 10 AVG. REFL MODE. 1000-1700 nm 10 nm STEPS. 7 IFRAMES InGaAs. IR20X, MIRLCTF, ΔT 16MS.

• 000228-jmr-05-SOURCE T.tif
UNFOCUSED SLIDE. FULL LIGHT. R MODE. 10 AVG. 1000-1700 nm 10 nm STEPS. 7 IFRAMES. InGaAs, IR20X, MIRLCTF, ΔT 16 ms.

• 000228-jmr-06-SOURCE T.tif
UNFOCUSED SLIDE. 10 AVG. 2 LIGHT BARS. T MODE. 1000-1700 nm, 10 nm STEPS. 7 IFRAMES InGaAs, IR20X, MIRLCTF. ΔT 16 ms.

June 1, 2000 Thursday. ATP - PL of C 21

• 000601-jmr-01-restarg.tif — RESOLUTION TARGET. (6-1) 20X OBJ. TRANS MODE. 680nm. 1 FRAME. ΔT 1SEC B2X2

SPOT 1

• 000601-jmr-02 ZnSe T.tif — ZnSe #485. WSOURCE T 700-1100nm @ 10 = 41 FRAMES. PEAKS/SHARPEST IMAGES AT 900 + 990nm. B2X2 ΔT 1SEC 20X.

• 000601-jmr-03. ZnSeR.tif — R MODE - MERCURY SOURCE. ZnSe #485 700-1100nm @ 10nm STEPS = 41 FRAMES B2X2 ΔT 1SEC 20X (SAME SPOT)

SPOT 2

• 000601-jmr-04-ZnSe-T.tif — TUNGSTEN SOURCE. ZnSe. #485 850-1100nm @ 10nm STEPS = 26 FRAMES. B2X2 ΔT 1SEC 20X (SPOT 2) T MODE

• 000601-jmr-05-ZnSeR.tif — MERCURY SOURCE R MODE SPOT 2 ZnSe #485 850-1100nm @10 ΔT 1SEC 20X 26 FRAMES R MODE. B2X2.

• 000601-jmr-06-BGT.tif — FOR 04 — TUNGSTEN SOURCE: BACKGROUND UNFOCUSED SLIDE 850-1100nm @ 10nm STEPS = 26 FRAMES. B2X2 ΔT 1SEC 20X T MODE.

• 000601-jmr-07-BGR.tif — FOR 05 — MERCURY SOURCE. BACKGROUND UNFOCUSED SLIDE 850-1100nm @ 10nm STEPS = 26 FRAMES B2X2 ΔT 1SEC 20X R MODE.

-330-385 BP AT SOURCE, 665LP AT LITE ADDED.

Continued on Page

Read and Understood By 198

Juliann M. Rice — Signed
June 1, 2000 — Date
Signed
Date

PROJECT NIR-MICRO. CZT EGGES. -EV PRODUCTS. [redacted]

• 000802_jmr_05_CZT's_microNIR T. TESTING OF XYZ STAGE SCAN SOFTWARE/ BINARC MONTAGE C1 SOFTWARE.

I ACQUISITION [ACQUISITION MANAGER SETTINGS]

SCAN AREA ~~TL (0,0) B,R (263 (R,B)~~
L-0 T-0 R-3200 B-2630 - PIXELS
STEPSIZE - HORIZONTAL - ~~350~~ 381 STEPS | VERTICAL - ~~3~~ ~~2??~~ 292 STEPS |
X AXIS # STEPS ~~10~~ 9 | Y AXIS # STEPS ~~10~~ 10 | ~~Z AXIS 0 STEPS~~
10 FRAMES AVE. FULL CHIP FILTER DISABLED.
90 FRAMES TOTAL (9 X AXIS X 10 Y AXIS FRAMES)
NOLCTF, SENSOR'S UNLIMITED FPA (InGaAs), TUNGSTEN TMODE.
BX-60 PLATFORM, 20X IR OPTIMIZED OBJECTIVE.

II ANALYSIS
CHEMIMAGE 4.35 PARTICAL STATISTICS. 000802

• ~~000802_jmr_06_STAGE ONLY. BG~~ BACKGROUND. GLASS STAGE ONLY.
TUNGSTEN T MODE.
HORIZONTAL - ~~3200~~ ~~39??~~ 3962 PIXELS / 381 ~~STEPS~~ PIXEL/FRAME = ~~9~~ 11 FRAMES. VERT ~~2630~~ ~~2661~~ 2696 PIXELS / 292 ~~STEPS~~ PIXEL/FRAME = 10 FRAMES.
~~9X10~~ 11X10 = ~~90~~ 110 FRAMES TOTAL.

• 000802_jmr_05_TMODE (SAME AS 06)

• 000802_jmr_06_CZT 435 MICRO NIR R MODE. - SAME AS 05 - R MODE
HORIZONTAL - 3962 PIXELS / 381 PIXELS/FRAME = 11 HORIZONTAL FRAMES. VERT: 2696 PIXELS / 292 PIX/FRAME = 10 VERTICAL FRAMES
11X10 = 110 TOTAL FRAMES.
(1 Z STAGE) TUNGSTEN R MODE. InGaAs FPA (SENSOR'S UNLIMITED)
20X IR OBJ. BX-60 PLATFORM. 10 FRAMES AVERAGED.

• 000802_jmr_07_BG FOR 06 RMODE. BACKGROUND FOR 06. R MODE GLASS STAGE ONLY. 110 FRAMES.
[BG]

• 000802_jmr_08_BG FOR 05 TMODE. TMODE. BACKGROUND FOR 05. STAGE ONLY 110 FRAMES.
[BG]

• 000802_jmr_02_MACRO BF - DIGITAL IMAGE BF MACROSYS CONFIG (01 DATA)
• 000802_jmr_03_MICRONIR - DIGITAL IMAGE MICRO NIR SYS (NOLCTF)
• 000802_jmr_04_MICRONIR - CLOSEUP (CLOSE-UP OF 03)

Continued on Page

Read and Understood By

215

[signature] August 14, 2010.
Signed Date Signed Date